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Editorial.

THE VETERINARIAN AND THE PUBLIC.

It is not the stock-owner only who should appreciate the services of the veterinarian, but the public also is indirectly benefited by his activities and gathers some advantages from him. When all civilians owe a present debt to our soldiers, it is certain that a fair proportion of obligation and gratitude is due from the proletariat to the members of the Army Veterinary Corps. The preservation of the health of animal life is of economic value to the people, and the restoration to health or usefulness of sick, lame, or injured horses has its good effect on the trade and transport of a community. With many equines incapacitated or unworkable in a town or city serious results accrue to those who depend on the removal of goods to keep their businesses going, on transport for a living, on the reception of supply for life. The suppression of glanders and tuberculosis is work directed against a menace to the public from two dire diseases.

From a sentimental and humanitarian point of view, which will especially appeal to the women of the nation, it is well that the lives of dogs and cats be rendered as happy, useful, and complete as possible, and much depends on the veterinarian in this connection. One or two canine and feline diseases are communicable from animals to man, and by reason of the usual intimate contact between subject and owner there is real danger of communication and spread of the maladies. The veterinary surgeon can explain the matter and lessen the danger of infection.

The published reports from towns and cities where meat and milk inspection are carried out show what service is rendered in safeguarding the health of the adults and children of the region, and give some idea of how much more could be done for human welfare if these two operations were by any means universally adopted. A good and wholesome food supply and a hygienic production and distribution of meat and milk are things to which humanity is entitled in civilized countries. The work in connection with the supervision of these proceedings is essentially one for the veterinarian, and as education and enlightenment spread the public demand for official veterinary surgeons is likely to increase. Not that we are in favour of wholesale officialism, for we remember that the last letter we ever had from an ordinary practitioner in Germany (the land of officialism) concluded thus: "May God in His infinite mercy preserve you from the type of man corresponding to the official German veterinary surgeon." Nevertheless, a due proportion of officialism in veterinary matters is beneficial. In our private capacity as ordinary practitioners we can do much good in giving salutary hints on hygienic procedure and warnings as to the danger of consumption of, or contact with diseased flesh or tainted or damaged nutriment. To show in a slight degree how serviceable we may be to the public and how knowledgeable we ought to be, we have known veterinary surgeons to be consulted without fee or reward as to the wholesomeness of a duck for the family dinner on Sunday, the goodness of fish for breakfast, the propriety of certain sausages as food, and the soundness of a flitch of home-cured bacon. The public in these isolated cases appealed to the man it thought ought to know, and something may be said in favour of its discernment, for who ought to have better knowledge of these things than the veterinarian?

The benefit to the general public of the control by the State, working through its veterinary surgeons, of the chief infectious diseases of animals cannot be over-estimated. Foot-and-mouth disease, anthrax, swine fever, and tuberculosis are controlled almost as much in the interest of the public as in that of the stock-owner. The study of animal diseases is necessary to work out methods of control. A more extended and better fostered encouragement of research and a liberal endowment of veterinary schools are both operations tending to

benefit the people. The Board of Agriculture research workers have already done good service. The use of abortin promises well, the employment of swine fever serum is destined to check the ravages of the plague, and thus save many pigs to increase the nation's food supply. The losses from Johne's disease will decrease as knowledge of its symptoms, methods of spread, and how to deal with it become more universally grasped. As other fields of inquiry into disease open out the control net will probably be cast wider, and further maladies causing loss of food supply or defective victuals will be caught within its meshes.

Having reviewed some of our services to the community, we wish it could be written that we are always treated as we deserve. In too many cases, both in private practice and in public work, we are looked upon as tradesmen or uneducated men beyond the pale of the intellectual and cultured classes. Too often we have to treat with principals through the medium of stablemen, underlings, and general factotums. The right impression and knowledge of us is too seldom acquired directly by the men who employ us. An unscrupulous and ignorant time-server who has not got his palm self-sufficiently oiled frequently has the power to carry a distorted view of us and our procedure to his complacent master. Occasionally the latter might be agreeably surprised if he got in touch with us oftener and took more interest in his stable. Like the man whose first acquaintance with the parson of his district was made on his deathbed, he might say: "I never knew there was such a worthy man among us, otherwise I would have conferred with him oftener." Public bodies, politicians, and the State do not always give the veterinarian the remuneration and credit that he is entitled to. In many cases it is due to faulty or false ideas and knowledge of his worth, work, and influence.

G. M.

A STATE-OWNED STUD.

THE liberal and patriotic offer of Colonel Hall Walker to the nation has been accepted after some hesitation. A fine collection of bloodstock has come into possession of the Government as a gift. It would have been a lamentable mistake if the chance had been missed.

The time could not be more opportune, and such a favour is,

we believe, unique in the history of any country. Various foreign Governments have possessed their State studs for some years, but they have been acquired after much expenditure of time and money, and have never been obtained free of charge. When State studs are properly managed they are of inestimable value. They furnish a nucleus for the all-round improvement of equine stock. Scientific information on breeding matters that can hardly be obtained otherwise may be gained from their reports. Statistics of great service to the science of zootechny may be collected and tabulated from the results of the operations carried out in their management. They may point the right way to get the best results in horse-breeding. They improve stock and tend to limit the production of worthless animals. Many advanced countries have several State studs, and we know what some of them have done in the matter of horse-breeding.

Besides a good supply of stallions, however, we want an increased number of first-class brood mares. This is the matter now that needs the closest attention and speeding up. The produce of a stud needs to be kept in the country, and protective measures adopted towards it. Austria-Hungary gave £170,000 for the Kisber stud, bought from the Batthyani family, but the progeny of the stock are only sold subject to the following conditions: "No foreigner can buy at all. The buyer is, moreover, bound never to start a horse so bought in any selling race, never to sell it to a foreigner, nor to allow its produce to leave the country."

It is said that we have spent over £12,000,000 in one foreign country alone in buying horses for our Army since the beginning of the War. When are we going to conduct things on right lines and give some of our own countrymen the benefit of such sums of money? We want more State studs, and Colonel Hall Walker has set a noble example to the Empire, and deserves the heartiest thanks and gratitude of all well-wishers of our country, and of all those interested in the welfare and advance of light horse breeding.

G. M.

General Articles.

REPORT ON THE USE OF A HYPERTONIC SOLUTION OF COMMON SALT IN VETERINARY PRACTICE IN THE FIELD.

By J. R. GREIG.

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SOME weeks ago I received a copy of a memorandum describing the method of "lymph lavage" and the use of a hypertonic solution of common salt in the treatment of the bacterial infections of wounds.

I have carried out treatment on the lines laid down therein, and have the honour to submit the following report on my experience in the use of this method.

A clean-cut aseptic wound is rarely met with in the field, and as it is practically impossible to presume such in a condition of asepsis, I had hitherto made it my practice to employ an antiseptic in the treatment of this as of all conditions of wounds, but in these cases in which the method of "lymph lavage" has been adopted I have completely dispensed with the use of antiseptic lotions and dressings, although at the same time disinfectants have been freely employed with a view to obviating the chance infection of one wound from another through the medium of contaminated instruments, &c.

The treatment, which was at first carried out on experimental lines, has been applied to all classes of wounds, from simple abrasions to serious cases associated with bacterial infections of suppurative and gangrenous character, and I have been so satisfied with the results that I have adopted it as general routine practice.

The method is carried out as follows:—

The salt solution is employed in strengths varying from $2\frac{1}{2}$ to 10 per cent., depending on the amount of bacterial infection. The wound is first of all swabbed out by means of a clean piece of cotton-wool, and all purulent discharges and extraneous matter, &c., removed. The application of the hypertonic solution is then made by means of an ordinary wound syringe, and should be repeated every four or five hours for the first two days. In those cases in which it is practicable, each application may be followed

by lightly bandaging a pad of cotton-wool saturated with the solution over the wound surface; where this is done, however, one should be careful that the natural drainage is not hindered.

The provision of adequate drainage is a "*sine quâ non*," as the rationale of the treatment depends on a continuous free flushing of the wound surface by lymph. To ensure free discharge the wound may, if necessary, be laid open, and where practicable dependent drainage openings provided.

The increased lymph production induced by the hypertonic solution evidences itself soon after the commencement of treatment, and in from twenty-four to thirty-six hours it assumes the form of a more or less copious discharge, which continues for a period varying from forty-eight hours to four days. In the case of suppurating wounds the discharge is at first thick and purulent.

This "primary discharge" gradually gives place to a "secondary discharge," which is thinner and more translucent in character, and which, apparently, consists of lymph of high phagocytic activity.

The "primary discharge" appears to act principally as a cleansing agent. As it is "drawn into the wound" it washes with it pus and necrotic matter resulting from the suppurative and gangrenous processes, and these in turn are checked by the phagocytic character of the "secondary discharge" and the subsequent lymph lavage.

When the pyogenic or putrefactive organisms concerned in a bacterial infection have been overcome their effects quickly subside, and healing progresses rapidly by granulation.

The authors of the memorandum state that "the 'drawing agent' has done its work as soon as it has checked the spreading invasion of the tissues, and the wound surface has clothed itself in bright coral red granulations," and they recommend that "the hypertonic solution may then be replaced by some simple dressing." I have found, however, that the healing process may be successfully carried out from this stage by the use of more dilute solutions of the salt—e.g., $2\frac{1}{2}$ per cent.

The authors also recommend that $\frac{1}{2}$ per cent. sodium citrate should be combined with the sodium chloride in order to render the lymph incoagulable. This agent has not so far been available, but I believe that a freer discharge might be induced by the use of some such decalcifiant.

When I first adopted the method it was my practice in dealing with bacterial infections to wash out the wound with an antiseptic before applying the salt solution. This was done with a view to effecting a partial sterilization of the wound cavity, or, at any rate, producing an unfavourable medium, and so inhibiting microbial growth. In the light of further experience this procedure seems unnecessary, if not actually harmful, as it will tend to paralyse the phagocytic action of the leucocytes. In any case, if it is considered advantageous to use an antiseptic in conjunction with the lymph lavage treatment, such an agent as perchloride of mercury should not be employed, as, by its action in coagulating albumin, it interferes with the free outflow of lymph which is so desirable.

In clean-cut wounds of recent origin I have found that applications of a comparatively weak solution of the agent, e.g., $\frac{1}{2}$ per cent., effectively prevents suppuration, and uninterrupted healing is the rule; while in the case of suppurating wounds, abscess cavities, and indolent sores, the purulent discharges are quickly cleared up, and the wound surface assumes a "healthy" appearance.

In contused wounds of a necrotic type, such as saddle and surcingle galls, the use of the hypertonic solution has proved of marked value. After the surgical removal of the necrotic core, the slough of the remaining necrosed tissue is aided by the copious discharge of lymph, while the active phagocytes which the latter contains would also seem to play an important part in the absorption of the dead material.

Before adopting "lymph lavage" I experienced considerable difficulty in dealing with these bacterial infections which give rise to the conditions known as "gaseous gangrene" and "gas phlegmon," and which occur as fairly common sequelæ to projectile wounds, and to contused wounds the result of kicks. I have had no opportunity of carrying out a bacterial investigation into the cause of the conditions, which are presumably due to an aerogenic putrefactive organism—possibly the bacillus of Welch. These conditions, which proved very resistant to antiseptic treatment, are quickly overcome by "lymph lavage."

I have not so far observed any unfavourable symptoms which might be regarded as attributable to the treatment, except that on one or two occasions I have met with cases which in the

progress of healing exhibited a tendency to the formation of exuberant granulation tissue. This, however, may be restrained by the adoption of suitable measures and the strength of the salt solution reduced.

On the other hand, the method possesses several advantages apart from its therapeutic value. Common salt is very cheap, and is always obtainable in the field, while the simplicity of the treatment renders it easy of application.

ENTERO-HEPATITIS OR BLACK-HEAD IN TURKEYS.

NOTES AND EXPERIMENTS.

By CHAS. H. HIGGINS, A. B. WICKWARE, AND N. M. GUIOU.

THERE have been undertaken at this laboratory for the past few seasons a number of experiments having as their object the rearing to maturity of turkeys from a flock of infected birds.

The researches into the nature of this malady have been connected with the etiology, diagnosis, treatment, and prophylaxis. It is to be borne in mind that what we may offer is intended as a synopsis of our work and observations and not as a full treatise on the disease. As our experiments have been conducted on a small scale, too much dependence cannot be placed upon the interpretation of the reactions or the results obtained.

ETIOLOGY.

At the outset we may state that we accept, in the absence of incontrovertible data, the amoebic theory of the disease, originally reported by Theobold Smith in 1894-5.*

We have conducted numerous experiments with amoebæ from the more common sources with a view of familiarizing ourselves with the methods of cultivation. It having been reported by various observers that amoebæ normally exist in the intestines of many animals, plate cultures were made from a variety of sources. Plates were inoculated from the intestines of nine guinea-pigs, and two of these yielded growths of amoebæ. The site from which we took the material was, in most cases, the cæcum. Cultures taken from two frogs which it was expected

* U.S. Department of Agriculture.

would be more likely to harbour amoebæ than any of the other animals, resulted negatively. A few amoebæ were obtained on a plate culture made from the intestine of a toad, while the intestine of an English sparrow yielded amoebæ in abundance. The usual method of inoculating the plates was to smear some of the intestinal contents directly on the surface of the medium. In the case of the sparrow and toad, however, the intestine was removed from the abdomen, slit open along its entire length and left in a Petri dish of dilute alkaline broth for a few days. At the end of that time some of the scum which had collected on the surface of the broth was transferred to the surface of a solid medium. This method was found to yield satisfactory results. In the case of the turkey, amoebæ have been obtained in abundance on a plate culture made from a liver presenting the characteristic lesions of enterо-hepatitis, but we have not secured this positive result in every case, and further observations are necessary before we can be sure that the lesions of enterо-hepatitis constantly yield a growth of amoebæ. A plate culture from the diseased cæcum of a turkey affected with enterо-hepatitis showed the presence of amoebæ after three months.

On several of the amoebæ plate cultures of animal origin the presence of actively motile paramecia was noted, and, in the case of the culture from the cæcum of the turkey affected with enterо-hepatitis several other varieties of actively motile protozoa were present.

In addition to these studies of organisms thought to bear some causal relationship to this disease, inoculation experiments with pathological material obtained at autopsy have been carried out to a limited extent on some of the laboratory animals with a hope that some light would be thrown on the etiology of this affection. The experiments performed are listed below, but as many of these have not been repeated we cannot attempt to draw any general conclusions therefrom. A great advance would be made in the study of the disease could it be communicated to some of the more easily handled laboratory animals.

DIAGNOSIS.

The diagnosis of enterо-hepatitis in acute cases presents no difficulty. This loss of muscular tone producing moping with drooped wings and head, the cyanotic appearance and sometimes

atrophy of the normally red appendages about the head, and the passing of liquid, yellow, malodorous droppings, produces a clinical picture that cannot be mistaken. In addition to the above mentioned well-marked symptoms, we have noticed in some of the birds a red ring around the anal orifice at the mucocutaneous junction, and in these birds a distinctly pinkish coloration of the scaly portions of the legs is quite obvious. In young pourets the liver lesions may sometimes be seen through the thin abdominal wall. On *post-mortem* examination the liver spotted with yellow areas about the size of a 10 cent piece and the greatly enlarged cæca are quite characteristic. The ureters have been observed to be full of yellow pigment, so the origin of the yellow pigment in the droppings is at least partly accounted for. It is reasonable to suppose that the yellow pigment produced in the liver lesions is carried by the blood stream to the kidneys and there eliminated.

The following table appears to indicate that a sub-normal temperature is a feature of the disease:—

Turkey	Temperature	Turkey	Temperature
293 [*] †	106	347	107'2
443 [*]	106'2	351	107'3
401 [*]	107	402	107'3
317	107'1	31	107'4
461	107'2	449	108'1

* Clinical case of blackhead. † Died of the disease on the following day.

THE SERUM DIAGNOSIS OF ENTERO-HEPATITIS.

Considerable work has been conducted in an endeavour to obtain a method for the serum diagnosis of this disease with the hope that it might be of service in determining the existence of an infection in chronic carriers. We are unable to say at present whether the disease will admit of diagnosis in this manner, but a brief summary of what has been done is here given.

The first difficulty that presented itself in endeavouring to diagnose the disease by the serum method was the absence of the causative micro-organism from which to prepare our antigen. Accordingly we have endeavoured to obtain an active antigen, using therefor a modification of Wassermann's original reaction for the diagnosis of syphilis, in which the antigen is prepared from a liver rich in spirochætes.

We find that the best method of obtaining the sample of blood from the turkey is to make a small incision with the point of a

sharp scalpel over one of the large veins on the under surface of the wing, the incision running lengthwise of the vein and extending through the skin, superficial fascia, and the wall of the vein. The blood is collected in a flat-bottomed vial. In this way 25 c.c. of blood can be readily obtained from an adult bird. The ordinary method of taking the sample in one of Wright's blood capsules has been found to be unsuitable in the case of the turkey, for owing to the high temperature of the bird the blood clots almost as soon as drawn and plugs up the small arm of the tube. The serum is drained off the clot and inactivated by heating from 55° to 58° C. for thirty minutes.

Two kinds of antigen were prepared, alcoholic and saline. The alcoholic antigen, prepared from black-head liver in the same way as "syphilitic" antigen is prepared from guinea-pig liver, at first gave satisfactory results but subsequently developed haemolytic properties and had to be discarded. A saline extract of black-head liver was prepared by shaking up the diseased tissue with glass beads for about three days in the shaking machine. It was proved to be non-haemolytic, and 1 c.c. of a 10 per cent. solution was found to fix 3 M.H.D. of complement. The guinea-pigs which had already been injected with black-head liver emulsion were given several injections of this saline extract at four-day intervals. At the end of the time the serum of one of these guinea-pigs, when examined for antibodies, gave complement fixation with the saline enterō-hepatitis antigen and alcoholic enterō-hepatitis antigen, but not with alcoholic antigen prepared from guinea-pig liver. Had this experiment resulted negatively it would have shown us that there were no antibodies for our supposed antigen and attempts to get a serum diagnosis would have been useless. The positive result while not by any means proving that there are specific antibodies for our antigen at least allows a possibility for their existence.

An attempt was then made to apply the complement fixation test to several of the laboratory turkeys, some of which were supposed to be chronic carriers of enterō-hepatitis infection. The quantity of serum which contains enough amboceptor to combine with the minimum haemolytic dose of complement varies in different diseases. In syphilis 0·05 c.c. is sufficient, while in glanders 0·1 to 0·2 c.c. are required. It was thought that as the birds at that time did not have the disease in an acute form

a large amount of serum would have to be used in order to get enough antibodies. Accordingly 1 c.c.* was used. The result was that practically every tube showed complement fixation. On consulting the control tubes it was found that the turkey serum alone was fixing the complement. This rendered the estimation of the complement-fixing power of turkey serum necessary. This was accomplished with a mixture of the sera from different turkeys, and it was found that 1 c.c. of turkey serum fixed six doses of complement.

The next time the test was applied serum was obtained from a turkey affected with entero-hepatitis, and serum from a young healthy poult was used as a control. The necessary allowance was made for the complement fixing power of the turkey serum and antigen, and the result of the test was complete haemolysis in the case of the young turkey serum with a slight evidence of complement fixation in the tube containing the entero-hepatitis turkey serum. The control tubes showed that the haemolytic system was working and that none of the substances used fixed all the complement themselves.

It was then thought that the requirements necessary to make the test practical were to ascertain by repeated trials the right strength of antigen and the right quantity of entero-hepatitis turkey serum that would cause a complete suspension of haemolysis in a positive case. The test has since been conducted with various quantities of antigen and turkey serum, but it has been found that while there is undoubted evidence of complement fixation that the serum control tubes also show a certain amount. This would indicate that the complement fixing power of turkey serum is very considerable, and a large amount of work will yet have to be undertaken to determine whether this is a variable factor in the test before we can say that the disease admits readily of a diagnosis by the method of complement fixation.

Precipitins.—It has been found that entero-hepatitis turkey serum gives a precipitate when added to extracts of diseased liver, but enough work has not been conducted in this connection to enable us to express an opinion as to the specificity of this reaction.

* As a matter of fact this part of the test was performed in small tubes, a definite quantity in a nippled capillary pipette being taken as equivalent to 1 c.c.

PROPHYLAXIS.

* In endeavouring to discover methods which will prevent the spread of this disease, we must first find some measure which will as efficaciously as possible stop the transmission of the disease from parent to offspring, or, from the chronic carrier to the healthy bird. Furthermore, this method must at the same time be of such a nature as to admit of the practical employment by the average farmer.

The ideal to be attained is to have a flock free from disease, start this flock in clean sanitary surroundings, and breed from them without the introduction of new birds which may be chronic carriers of the disease. In our judgment it would be better to raise a flock from the eggs by artificial incubation and brooding.

An attempt has been made to raise a healthy flock from birds that are known to be infected by incubating the eggs and keeping the poult on ground where turkeys had not previously been quartered, and never letting them come in contact with the adult birds. As a control, a small flock of naturally hatched poult were allowed to run with an adult hen turkey which had been a member of the infected flock.

This experiment was unfortunately interfered with by the crows destroying a large number of the incubated poult, but the experiment was still continued. It may be said that no dependence could be placed in the experiment should the isolated turkeys not develop black-head, as some farmers' flocks are healthy anyway; but it must be borne in mind that the disease exists in a virulent form in the flock of adult birds at the laboratory so that there is every opportunity for the disease to be transmitted from parent to offspring.

The result of the experiment has been that four poult allowed to run with the adult bird have developed the disease and three deaths have occurred, while as yet no evidence has appeared of its existence in the isolated birds. It must be admitted that the experiment has been necessarily conducted on an exceedingly small scale and that it will have to be repeated several times before we can attempt to draw any conclusions. The fact that at the present time among the adult birds and the poult that have come in contact with them there have been several clinical cases of black-head, and deaths have occurred, while the isolated artificially incubated birds are free from the disease, gives

promise of further investigations into this system of prophylaxis resulting favourably.

TREATMENT.

In searching for a remedial agent for this disease we have endeavoured to investigate some of the substances used in the treatment of protozoan affections. It was first necessary to determine the dose for the turkey and then as cases occurred the effects of these agents were noted.

There is to our knowledge no known specific for controlling the ravages of this affection.

Muriatic Acid.—The use of the muriatic acid in the drinking water was found some seven years ago to be followed by beneficial results on affected turkeys which one of us (Higgins) endeavoured to raise. Later it was given a further trial, and three years ago a single turkey at this laboratory made an apparent recovery. During the past four years we have recommended it as being the best medicinal agent which we know to assist in overcoming the affection. A large number of the affected birds have recovered after receiving liberal allowances of this acid.

Some apparently remarkable recoveries have followed the use of this acid, but one cannot hope to bring all affected birds through an attack.

The acid used is a teaspoonful of muriatic acid (Acid Mur. Dil. B.P.) in a quart of drinking water. This acidulated water should be placed in a porcelain or glass vessel and is suggested in the hope that the birds may be carried over an acute attack. At the outset, when the birds show evidence of being severely affected, it may be of advantage to triple the amount of acid (using three teaspoonsfuls to the quart of water) for the first three days. This amount will not injure the turkeys and may assist them in more rapidly overcoming the infection.

They should be confined during this period on dry, sanded board floors, in well-lighted and well-ventilated quarters and allowed access to no other liquid. If allowed to roam they may obtain sufficient water for their requirements from the dew-laden grass or other sources, and therefore will not drink the acidulated water. If confined, green food should be supplied in addition to the grain ration.

ATOXYL.

The use of this arsenical preparation in trypanosomiasis has suggested its use in this supposedly protozoan affection. Up to the present time we have only determined what would be a safe dose for a turkey, as we have not had a case to try it on without interfering with our other experiments. It has been found that the hypodermic injection on four successive days of amounts increasing from 1 c.c. to 2 c.c. of a 4 per cent. solution have not been followed by untoward result.

ACTIVE IMMUNIZATION.

It was thought that the injection of extracts or emulsions of diseased liver might assist in the treatment of the disease by helping to create an active immunity. It has been found, however that injections of saline extracts have no beneficial effect while the injection of liver emulsion apparently increased the severity of the cases on which it was used, probably by causing a severe anaphylactic reaction.

Provision has been made for the further pursuit of this very important and interesting problem. We anticipate being able to arrive at more tangible conclusions in our projected experiments as a result of the experience already gained. We would point out, however, that in the last report of the Director of the Rhode Island Experiment Station, he states that they seem to have made comparatively little progress in overcoming the ravages of this disease. The work was commenced at the Rhode Island Experiment Station in 1894 by Dr. Theobold Smith and has since been continued under the direction of various investigators. Apart from the very valuable data secured by Theobold Smith there has been a very little in the findings from time to time reported from this station having a bearing on the practical measures to be adopted in overcoming this affection.

CONCLUSIONS.

(1) Enterο-hepatitis or black-head in turkeys is a disease affecting the liver and cæca (blind guts) caused by the amœba meleagrididis, described by Dr. Theobold Smith in 1894-5.

(2) Recovery from an attack during the first season may be followed by one or more attacks during that season through which they may or may not pass in safety. Turkeys after 1 year

of age rarely show evidence of the disease, yet on autopsy may present lesions.

(3) Turkeys [as outlined in (2)] may pass through an attack of this affection, after which they are chronic carriers of the infective agent for an indeterminate period.

(4) Treatment of affected birds may or may not be effective. Muriatic acid has given good results, but is not infallible. It can be used without fear of untoward results. Emetine hydrochloride has been effective in a few instances, but is too dangerous for general adoption and can only be used under skilled direction.

(5) The hatching and rearing of turkeys by artificial means on uninfected ground and away from other fowl gives promise of a means for overcoming the ravages of this malady.

(6) All weak or inferior poult's should be destroyed at once and none but the most vigorous individual birds retained for breeding purposes.—*From Report of Veterinary Director-General, Department of Agriculture, Canada.*

EFFECTS OF HEREDITY IN BOVINE TUBERCULOSIS.*

BY HARLOW BROOKS, M.D.

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THAT a very high percentage of dairy cattle are tuberculous, that is, are "reactors," is a universally admitted fact. State and municipal laws are more and more insisting that the milk of tuberculous animals shall not be sold, and the question of bovine tuberculosis has become a serious economic as well as hygienic problem. When one realizes that for general use milk must be furnished at a rate which can be paid by the average citizen and at the same time appreciates the fact that the dairyman must expect from 15 to 50 per cent. of his stock to be ruled out if the tuberculin tests are rigidly enforced, the problem of milk supply becomes a factor of very great difficulty as well as importance. A further fact of great bearing is the strong probability that the more highly blooded cattle are most likely to be

* Read before the Association of American Physicians, May 13.

found to be reactors. This makes the problem of the honest and ambitious dairyman even more difficult, for if he attempt to increase the quality of milk or the butter production of his herd, he almost invariably breeds in tuberculous stock, and unless extraordinary and expensive methods of isolation are practised dissemination of the infection is almost certain to follow. On the other hand, if he fails to thus improve his stock he is very likely to get into trouble because the quality of his milk may be found deficient and he thus also lays himself liable to prosecution.

The difficulty of improving breed is a very serious matter, particularly for the farmer of small capital, since the price of blooded stock is always high and he is very likely to purchase as non-reactors cattle which have been "plugged" against the tuberculin reaction by dishonest dealers. This trick of "plugging," though familiar to most stock men, I find is not widely known by physicians. There is no doubt but that when tuberculin tests are known to be about to be made, this method is practised so that negative results are obtained even in cattle which may be extensively so diseased. "Plugging" is performed by injecting a dose of tuberculin a few days before the public or legal test. For some time after the reaction which follows this injection, subsequent tuberculin tests are negative so that even widely diseased animals may be tested and sold apparently as free from tuberculosis. As can be seen, detection of this fraud may be practically impossible.

Another point often unrecognized by the hygienist is that the tuberculin test in cattle as in man is positive in animals which while they may harbour foci of the disease are not actively tuberculous, that is, the reaction may be given by cured cases. If we were to apply to man routine tuberculin tests it is certain that we should find many supposed and actually healthy individuals who would respond to the reaction. The term "reactor" is therefore indiscriminately applied by stock men to animals perhaps not actively or obviously tuberculous and yet which simply give the reaction. It is found, however, that when such stock, apparently otherwise sound, be housed and fed with perfectly healthy non-reactors the non-infected herd sooner or later become widely diseased for the sensitiveness of uninfected animals to tuberculosis is remarkable and apparently much greater than in man. The common practice of dairy men is to largely ignore

this fact, to take the chance as part of the risks of the business, and to eliminate only such animals as are obviously sick. These usually form but a small percentage of the real reactor group and under such methods the disease can never be eliminated from the herd.

The problem then becomes very complex, particularly from an economic standpoint. It is true that thorough pasteurization of milk will eliminate the possibility of transmitting tuberculous infection to man. I do not propose to enter into the discussion of this problem at this time but to especially point out that reactors in any herd eventually cause the more or less complete infection of that group.

The experiments conducted at Woodcrest, previously reported,* have apparently furnished a solution for this problem though it must be admitted a very expensive one indeed for the breeder of moderate capital, since it practically necessitates separate and distinct establishments and personnel, and enough capital to permit a more or less idle and largely non-productive group of animals.

To me personally the fact of greatest interest has been that the inbreeding of tuberculous animals has in no way impaired the type or desirability of the offspring. It has been conclusively shown that the calves are very rarely, if ever, infected before or at birth. That the slightest carelessness in exposure of the newborn calves to infection leads to certain disaster is illustrated by ten recent infections at Woodcrest through the negligence of one workman in not minutely following out the instructions laid down. Tuberculous animals of desirable types may therefore be freely used for breeding purposes provided that the calves are not allowed to come in contact with the infected parents. The economic as well as the biological importance of this apparent fact is obvious.

To establish the fact that reactors may furnish and perpetuate most desirable traits as to type, fertility, milk, and cream production, and to therefore controvert the suggestion that such infected animals should be utterly destroyed, notes of the following group of animals are presented, taken by permission of Mr. Dimick from the records of Woodcrest Farm.

* *Trans. Soc. Exp. Med. and Biol.*, 1914, vol. xi, No. 2, p. 50.

Pietje 22d, No. 70884.—The foundation dam of this strain was imported from Holland by the Woodcrest Farm. She was supposedly of the highest type representing the Holstein-Fresian breed and her pedigree shows descent from the finest animals of this stock. It has not been possible to ascertain whether or not she was derived from tuberculous parentage, but early tests at the Woodcrest Farm showed her to be a "reactor," although apparently in perfect health. She died of generalized tuberculosis at the age of fourteen years, four months. She is credited with four calves born in Holland and seven in this country. She made the following remarkable record:—

Butter, seven days' test	...	...	...	...	31·62 lb.
Milk, seven days' test	...	...	...	673·90	"
Butter, thirty days' test	...	...	...	128·37	"
Milk, thirty days' test	...	...	...	2,786·40	"
Butter, six months' test	...	...	...	566·60	"

This last item is stated to be the world's record for butter production for this time. During this same period she produced 13,673·90 lb. of milk. While at the Woodcrest Farm she gave birth to an annual calf with records as follows:—

(1) *Woodcrest Pietje*.—A bull calf; a perfect and effectively fertile specimen, sold as a herd bull. This animal is not known to be tuberculous, although it is strongly probable that he is.

(2) *Pietje 22d's Woodcrest Lad*.—This animal is a perfect specimen in every respect and has been retained at the head of the Boutekoö Farm as a stud animal. He is known to be tuberculous and is isolated with the tuberculous herd. A daughter of this animal has produced at the age of four years 35 lb. of butter in seven days. This is stated to be a world's record for this age.

(3) *Pietje 22d's daughter*.—This animal at birth was a perfect specimen in every apparent respect, although she was found to be tuberculous in the second year of her age. Her record is as follows:—

Butter, seven days	...	...	...	...	25·19 lb.
Milk, seven days	...	...	...	553·40	"
Butter, thirty days	...	...	...	104·29	"
Milk, thirty days	...	...	...	2,202·22	"

She was fertile each year and her offspring have all been perfect specimens of their kind. She died in January last from a generalized tuberculosis one week after the delivery of her last and perfect calf. This animal has not yet been submitted to the

tuberculin test but inasmuch as it was removed from the mother immediately after birth, from previous experience, it is assumed to be non-tuberculous. She was the dam of Woodcrest Jamaica Pietje; a bull calf, perfect in every respect and now the head of a valuable herd. This animal has proved to be normally fertile. A daughter in her second year has given a butter record for seven days of 16·07 lb., and of milk for the same time of 350·30 lb. Woodcrest Jamaica Pietje was removed from the dam at birth, isolated from the tuberculous herd, and is free from any disease. Also dam of Woodcrest Johanna Pietje: a perfect and fertile bull. He is free from tuberculosis as he was removed from the dam immediately after birth. Dam also of Woodcrest Pietje Pontiac: a perfect male specimen removed from the dam immediately after birth and consequently free from disease. This animal was sold while a calf for \$2,000, and is the anticipated head of a valuable herd.

(4) *Pietje 22d's second daughter*.—This animal has always been tuberculous, having received the infection apparently from her dam shortly after birth, none the less she was in every way a perfect specimen and gave a record of butter production for seven days of 29·63 lb.; of milk in the same period 584·70 lb. Butter thirty days, 117·24 lb.; butter for one year, 829·53 lb. Milk for the same time, 19,722·90 lb. This animal died apparently from a generalized tuberculosis in September, 1913. She had been fertile each year since her maturity and all her calves were normal specimens. Three of these offspring are recorded all perfect, typical, and fertile in every way.

(5) *Pietje 22d's son*.—This animal is a perfect specimen, although found to be tuberculous at the age of one year. He is at the head of a herd, serving about 100 animals yearly; is very fertile and typical of the breed in every way. His first five daughters at two years of age average over 18 lb. of butter in seven days each and over 4 per cent. of fat.

(6) *Pietje 22d's third daughter*.—Found to be tuberculous at three years of age; after having successfully passed two prior tests. Her record shows butter production in seven days, 16·07 lb.; milk production seven days, 302·30 lb. This animal is the dam of one heifer which has not yet freshened but which is a perfect specimen of her class.

(7) A bull calf, the last offspring of this remarkable cow, died

of an infantile diarrhoea in its very early youth, before it had been registered.

The male parentage in many if not most of these instances has been also tuberculous in all probability. The question of whether or not the offspring became tuberculous depends entirely upon exposure after birth. The point of greatest importance illustrated by this remarkable family is that no defects of a biological nature have been found in any of the offspring of this definitely tuberculous stem. All are perfect specimens. There has been no reduction in fertility, and judging from the milk and butter records no diminution in butter or milk production, and, as stated, several world's records have been attained by these animals.

This family is apparently fairly illustrative of others of like nature, and in so far as the observations go it seems definitely demonstrated that parental tuberculosis in the cow causes no defects to be apparent in the offspring even though the calf be born in the almost terminal stages of the diseases in the dam.

This report is also intended to point out that the term "reactor" as used by stock men often means what in human medicine would be classed as healed tuberculosis. It seems to show that definitely tuberculous animals may be safely utilized for breeding purposes and that they may be crossed and inbred with entire disregard of the factor of tuberculosis and purely for the purpose of improving or maintaining type. Most important of all, the fact stands out that although it may not be wise to utilize the unpasteurized milk of reactors for human consumption nor yet for the feeding of calves or other animals, yet reactors may be successfully and safely used as brood stock and thus cease to be an economic waste.—*American Journal of the Medical Sciences*.

VETERINARY COLLEGE PASSES.

The following students passed their respective examinations, viz.:—

"A," or First Professional.—William U. Main, Glasgow.

"B," or Second Professional.—Isaac McCauley, Kilrea, Ireland.

"C," or Third Professional.—David E. Orr, Glasgow.

"D," or Final Examination (obtained the Diploma of the Royal College of Veterinary Surgeons).—Archibald W. Campbell, Wishaw (Second-class honours); Thomas M. Timoney, Glasgow; Neil A. M. Macewan, Ardrishaig; Henry J. Hughes, Pontypridd, Wales.

Clinical Articles.

OBSERVATIONS ON "PURPURA HÆMORRHAGICA" IN THE HORSE WITH "ADDENDA" OF ALLIED AFFECTIONS.

By FRED. C. MAHON, M.R.C.V.S.

63, Above Bar, Southampton.

RECENTLY encountering some bad cases of "purpura hæmorrhagica" in two instances following upon bastard strangles, in another a sequel of influenza, and adopting a line of treatment far remote from the orthodox, I am induced to record the same in the pages of THE VETERINARY JOURNAL.

One subject was a thirty-year-old bay mare "which had not previously had a day's illness"—according to the owner. Grazing on herbage already invaded by some Army and other animals the mare had suffered severely from strangles—febra-pyogenica—was evidently invaded by the poison, and to such an extent that at one time I feared dissolution. The parotideal swelling, and resultant abscess after blistering and opening of same, took on a bad ulcerative process, the cavity measuring 13 in. in circumference at one time. Throughout the seizure the appetite was never remiss, and temperature did not exceed 104° 3° F. In this case my treatment was by tonics, as acid nitro-hydrochloric dil., liq. ammon. acet., and infusion of gentian in scalded hay, chaff, corn, and bran. In lieu of cantharides, or mercurial blister, I used repeatedly mustard oil, an agent I use extensively.

I gave hypodermically injections of strychnine and electuary of potass. iodidi, belladonna, and glycerine.

As an attack of purpura supervened on the tenth day I had recourse to adrenalin—my sheet-anchor in almost all cases—but if asked to explain why such good results follow in my experience I am afraid I cannot give a precise reply. Whilst writing of adrenalin "and its use in purpura," &c., let me quote a very able American writer, observer, and clinician (*vide* "Veterinary Materia Medica," fifth edition, p. 10 (Parke, Davis and Co.)).

Dr. J. H. King, of the Kansas City Stock Yards, states in "Veterinary Notes" of December, 1908, p. 12, that he finds adrenalin is a reliable means of diagnosing the presence of "heaves" (broken wind, asthma, emphysema of lung tissues).

Even though the horse has been drugged with stramonium or other sedative, he says: "I noticed that upon injecting intravenously 30 minims of adrenalin chloride solution in $\frac{1}{2}$ oz. of normal salt solution the breathing became accelerated in about one minute, and if the animal was only slightly affected with the disease it would immediately show the double-respiratory act, or double abdominal breathing, accompanied by the usual action of the costal muscles unabated for several minutes. I have used adrenalin chloride as a diagnostic agent for the past three years with the greatest confidence. In order to verify my diagnosis, I have kept track of these cases, and have always found afterwards that I was correct."

I refer to these notes as it was by accident in using same in Case No. 2 of purpura in another aged mare on the farm where my thirty-year-old "nag-mare" had strangles, followed by purpura and broken wind setting in suddenly, that after the first injection of 90 minims of adrenalin chloride my patient's breathing became normal, and this condition remained so for thirty-six hours approximately, and with the hæmorrhagic infarctions, petechial spottings of mucous membranes, and œdema, the broken wind was again noticeable. This to my mind opens up a serious question as to whether fraud is not possible by injections of horses prior to sale, and particularly if put to the crucial point. Post-mortem results and chemical analysis would not afford the practitioner or purchaser of a broken-winded horse much satisfaction, if at all.

Briefly, Case 1, a twelve-year-old mare (heavy van), cardiac weakness marked, temperature 98·6° F.; pulse, submaxillary 68 per minute, cardiac 90; both small, weak; intermittent œdema of all four legs, causing animal to remain a fixture in her stall. Head pendulous for two days, and animal stupefied, forcing head into a corner, and remaining in this position for hours. Here adrenalin repeatedly used. Saved this case. In fact, I have only attended her for a week. Value originally knacker's price. Today worth £20.

Case No. 2.—Thirty-year-old "nag-mare." Here again chief agent used adrenalin. Results marked. Recovery.

Case No. 3.—Thirty-year-old "cart mare." Purpura and broken wind. Again adrenalin chloride effected wonders, and I attribute recovery entirely to its judicious use.

Case No. 4.—Peculiar from onset. Diagnosis, "lymphangitis." Near hind limb markedly so. Off hind slightly. On third day knuckling over of near hind fetlock. "Dead lame." Shoe removed. No mischief apparent. Soap and iodine liniment, injections twice daily of adrenalin chloride 60 minims, liq. ammon. acet. in drinking water, bran mashes, linseed boiled, also linseed tea. One injection of physostigmine. No drenching. Recovery on tenth day and at exercise. Work in three weeks from seizure. One noticeable feature of this case was a symptom as if the animal had had a paralytic stroke. I believe some clot of blood or clots had formed in the renal vessels at one time, as the urine collected on three occasions showed on examination broken-down urine casts and red blood corpuscles. Here I used thermofuge to the loins, covered with wool, blanket, and surcimed well.

How is it that "adrenalin" is so marked in its physiological actions? Summarizing the conditions in which it is used by surgeons scattered throughout the globe, I find mention of it in *post-partum haemorrhage*, epistaxis, haemoglobinuria, lumbago, gravis conjunctivitis, laminitis, parturient laminitis, collapse following gun-shot wounds, keratitis, and other ocular diseases, azoturia, chronic haemorrhagic nephritis, purpura haemorrhagica, pleural effusions in the dog, and heaves (broken wind), and if one searched closely the pages of veterinary literature no doubt its employment may be noted in scores of other cases. In passing, I wonder if the sister profession uses it as we veterinarians do. Their records should prove interesting in the extreme.

To my mind it is a potent agent for good, and has revolutionized the treatment of many diseases, so should be glad to have records of its use and cases treated, recorded fully and more ably by the pens of the ready writers of our profession.

STRYCHNINE POISONING IN A DOG.

By HENRY TAYLOR, F.R.C.V.S.

Haywards Heath.

Poisoning by strychnine is not a very uncommon occurrence in the dog, the typical symptoms following quickly upon the ingestion of the drug as a rule. The following case presents one or two interesting features and may thus be worth recording.

One day, at 12 o'clock, a Dachshund dog, fond of hunting, came into his owner's house with the head of a young rabbit in his mouth, and judging by the rotundity of his abdomen, a good deal more of the afore-mentioned rabbit in his stomach. He remained quiet all the afternoon until 6 o'clock, then he got up from where he had been lying and walked out of the room through a window, which was low on the ground, on to a lawn, and from thence down some steps. When he reached there he had a fit, but pretty soon came round again. I was requested to see him then, and on my arrival found him apparently all right. I was informed that that morning a fox had been found dead near the gate at the end of the drive, presumably poisoned, and the question was asked, "Did I think the dog had got any poison?" The reply was to the effect that if the fox had been poisoned the chances are that the dog would not have been alive now, presuming he had partaken of the same bait. Seeing that he had dined, however, not wisely but too well, I suggested giving him a good dose of castor oil. The administration of this was then proceeded with, but he was a troublesome dog to dose, so a small pill in a bit of meat was offered instead, which he accepted. Just as I was about to depart, it was then about 7 o'clock, I noticed that he was walking about the room when suddenly he developed the characteristic symptoms of strychnine poisoning. There was no doubt about the matter now, and the provision and administration of large doses of chloral hydrate and potassium bromide was carried out.

Fit after fit came on in spite of the antidotes which were pushed to excess; the case looked hopeless, and it seemed preferable for him to succumb to chloral hydrate rather than the distressing strychnine, but after an hour or so he fell into a sound sleep, from which he did not awake till 3 o'clock next morning. Then he had another series of attacks, in one of which the owner thought he was dead. Chloral hydrate was again administered with success and he was finally got to sleep again. At 10 o'clock that morning he seemed drowsy and the liability to any more attacks to have decreased; as a matter of fact, from that time he gradually became better.

There are one or two points of interest about this case. The length of time which elapsed between the partaking of the poison and the onset of the first fit, viz., six hours, is un-

usual, and it was really one hour longer before the fits became diagnostic. Then, again, there was a marked recurrence after being under the influence of the antidote for, say, six hours. The fox probably died from strychnine poisoning, but if he had lived any length of time after eating the poison he would not have been found where he was, which indicates a good dose of the drug. The dog may have had his share of the alkaloid in the centre of a large piece of rabbit and this lump have taken hours to digest. The animal was never out of sight from 12 o'clock onwards, so there was no opportunity to pick up anything, and the length of time which elapsed before the symptoms came on seemed to negative the utility of an emetic. From the above instance it does not appear that one need be afraid of using plenty of chloral hydrate which is *the* antidote. Some years ago while attending a horse my attention was drawn to the stable dog which was showing symptoms of strychnine poisoning, *but not to any marked degree*, and although I used strong decoctions of tobacco with unstinted liberality, because it would have taken too long to obtain chloral hydrate, the dog died. The poison had been put down by the coachman's wife to destroy mice.

PNEUMOTHORAX IN THE COW CAUSED BY THE PRESENCE OF ECHINOCOCCUS CYSTS IN THE LUNGS.

By HENRY B. EVE, M.R.C.V.S.

Folkestone.

Subject.—An aged cow, in somewhat poor condition, suspected by the owner to be a “piner,” a bad doer.

History.—The animal had been bought at an auction sale by him, then in fair condition, was taken home and fed on rations along with the rest, which were all in good condition. However, in spite of good food and treatment, it began to gradually waste away soon afterwards. The cow had been ailing for a fortnight, and owner had tried doctoring it himself, but without success.

Symptoms.—The subject appeared dull, listless, unthrifty, visible m. membranes pale, discharge from the eyes and nostrils, had a staring coat, capricious appetite, and gave very little milk,

which was of a watery nature. Pulse was weak; respirations accelerated in rhythm like a broken-winded horse; temperature subnormal. Auscultation of the lungs denoted pneumothorax present on both sides, the right side apparently being more affected than the left. The udder was indurated in left quarters, and non-painful on manipulation. The cow had a nasty hacking cough, which was more noticeable in the early mornings, and the bowels were generally relaxed, but at times constipated. The abdomen was pendulous (pot-bellied), anasarca swellings present, also tympany of the stomach.

Diagnosis.—Chronic emphysema of the lungs.

Prognosis.—Unfavourable.

Treatment.—Tested the animal with tuberculin (ophthalmic) with negative result. Gave internally stimulating tonic powders in warm ale (pulv. ammon. carb., zingib., gentian, ferri sulph., calumba, and pip. cayenne), alternately liq. arsenicalis in drinking water. However, no improvement took place, so advised slaughter and *post-mortem*.

Diet.—Crushed oats, bran, decorticated cotton cake, hay, brewers' grains, cod-liver oil, common salt.

Post-mortem.—Revealed no signs of tuberculosis or Johne's disease, but a number of *echinococcus* cysts of the multilocular variety present in the lungs, one of which near the base of the right lung had burst, and allowed the air to escape from the lung. It was evident that the air which escaped entered the "parietes" of the chest, where the ruptured vesicle was found, and where destruction of tissue from pressure had occurred. During inspiration air had been pumped through the opening, and the emphysema spread by the respiratory movements along the subcutaneous tissues till it reached even the kidneys, in which latter region there were two large "air vesicles," even the surrounding kidney fat being blown up with air which had penetrated the tissues. I was unable to find any trace of any foreign body in the lungs or elsewhere.

Remarks.—I have seen *echinococcus* cysts present in old sows when making *post-mortems* dealing with suspected cases of swine fever, also in sheep, but never before in cows. In view of Tuberculosis Order, I thought the case interesting to veterinary inspectors under the same, as it clearly shows that emaciation can obviously arise from other causes than tuberculosis, and thus is worth bearing in mind.

LACTATION IN A SEVEN-DAYS-OLD CALF.

By J. WILLIAM FINK, D.V.S.
Newburgh, N.Y.

A HOLSTEIN calf born July 4, 1915, had a fully developed mammary gland secreting milk. The udder is about the size of two large fists with well developed teats about 1 in. long and milking from all four quarters; the milk is of good quality; the quantity, about a pint up to the third week, has now increased until it gives a quart night and morning.

The calf is from a grade Holstein mother and a pure bred bull. Has been kept by itself since it was born (and not with other calves), except when it was nursing. It began giving milk when it was seven days old. The owner noticed the udder enlarging the first week and tried one of the teats, and found to his surprise it contained milk, and has milked it steadily night and morning ever since, until it has increased in quantity to about a quart night and morning.

There is nothing unusual about the size of the calf, being an ordinary-sized month-old calf. I have searched all records, inquired of a number of dairymen and breeders, and have been unable to find a parallel to this phenomenal calf. Have had several veterinarians and expert herdsmen examine the udder and milk to verify the truth and condition, and had them milk the calf and examined the mouth.

At present the calf is being exhibited at the neighbouring county fairs, and pronounced by everyone who sees it as a remarkable freak of nature, and unheard-of before. It surely speaks well for the Holstein breed of cattle as milk producers at an early age.—From *Journal of the American Veterinary Medical Association.*

LAMINITIS AND LEUCOCYTIC EXTRACT.

By CYRIL GOLDING, D.V.S.
Dimuba, California.

ON April 24, 1915, I was called to treat a grade Percheron mare, nine years old, suffering from typical symptoms of an acute attack of laminitis. History indicated that she had suffered two previous attacks, and a very guarded prognosis was given.

The animal was in acute pain, temperature 104° F., pulse 65. Five doses of leucocytic extract (Archibald) of 6 c.c. each were administered once each twenty-four hours, intratracheally; no adjunctive treatment was given, resulting in a complete cure at the end of the fifth day of treatment.

Results obtained from the use of leucocytic extract in the treatment of several consecutive cases of laminitis have by far exceeded all expectations. Am reporting above case on account of the fact that this mare has suffered from two previous attacks, although of much less severity than present one. On previous occasions the usual routine or symptomatic therapeutics were applied, including phlebotomy, soak-tubs, injections of adrenalin chlor. into plantars, also the alum treatment, but in spite of same it has been compulsory to allow at least four weeks to elapse before she had sufficiently recovered to be able to resume her duties.

Providing such a word is permissible, leucocytic extract is a "specific" for laminitis.—*Journal of American Veterinary Medical Association.*

Canine Clinical.

AN ENORMOUSLY ENLARGED PROSTATIC ABSCESS IN A DOG.

By ARTHUR PAYNE, F.R.C.V.S.

Weybridge.

HALF-BRED collie, eleven years old.

History.—Had lost flesh the last three months, although appetite was good.

The only thing out of the ordinary which the owner had noticed was small pools of urine occasionally tinged with blood on the floor of the garage where the dog was housed at night.

On November 3 and days following the dog was observed to strain, as if he experienced a difficulty in passing his motion. After micturition he would walk carefully with back arched. Food was refused from this date.

Symptoms.—I saw the dog on the 8th, and straightway

examined him *per rectum*. I found an enlarged prostate which caused the dog to struggle on the slightest pressure. The bladder was engorged.

He looked very ill, and was with difficulty persuaded to get out of his bed and walk outdoors. I was surprised to see the urine come away quite freely.

I prescribed urotropine, and told the owner I would call on the 10th.

On the latter date there was no improvement. The appetite was in complete abeyance, the dog walked with difficulty, and vomiting had become frequent.

I wished to destroy the dog, but the owner would not give his permission. He died on 15th.

Post-mortem.—The bladder, or rather what I took to be the bladder, was distended, and contained about $1\frac{1}{2}$ pints of thick turbid fluid. On the right side of this distended sac was what appeared to be a second bladder, empty and the size of a small pear. The prostate was hypertrophied, but not to such an extent as I was led to believe. This second bladder was in reality the dog's bladder. Some of its muscular fibre must have given way, and a pocket formed by the mucus coat insinuating itself between them. The urine, finding that least resistance was offered here, the pocket was slowly enlarged, acting as a backwater, so to speak.

I ascribe these changes, in the first instance, to an acute attack of prostatitis. During this period resistance was offered to the flow of urine.

The over-engorgement of the bladder caused a breach in the muscular wall. When the active prostatitis had subsided the gland was reduced in size, and the urine again found its natural outlet, but the urine which had collected in the mucous coat could find no means of escape, and the death of the dog followed on the decomposition of the imprisoned urine.

War Notes.

OUR WAR-HORSES.

By FREDERIC B. HARVEY.

THERE is a suggestion of frost in the air this misty autumn morning, and the little group of military and Customs officials gathered on the quay awaiting the arrival of the "horse transport" are fain to stamp their feet and flap their arms in an endeavour to keep warm.

Nobody knows precisely when the boat may arrive in the river, because of the regulations which preclude an ordinary ship from using her wireless within a specified distance of the shore. But suddenly out of the haze a dim bulk looms; there is a spasmodic activity amongst the nondescript dockside labourers, and within an incredibly short space of time the vessel is made fast, and her huge hull towers above the landing stage.

In normal times the incoming ship is a well-known passenger boat. Now she is painted a sober black, and her holds and lower decks are filled with horses—packed as close, almost, as the proverbial herrings in the proverbial barrel. Huge doorways are cut in her side, and into these apertures gangways are run, down which the animals clatter to the land to which they have been strangers for many a novel day.

A thousand horses are on board, and wherever you go you see the muzzles of the patient beasts projecting in rows from the improvised stalls, their breaths hanging in tiny patches on the still air of the holds. An elderly little man, clean-shaven, with bow-legs, rimless glasses, and a faded pink sweater jacket, is bustling about. From his general aspect he might be a professor; and you are surprised to learn that in reality he is the chief horse-boy, and he tells you in strong American accents that they have not lost a single animal on the way across. "Some v'yage, eh, siree?" he says, beaming through his glasses. The other horse-boys include weird types, who carry with them an indescribable whiff of prairie freedom that appeals to the imagination of Englishmen—men in high-crowned hats, swarthy of skin, with soiled shirts open at the neck to the raw breeze; and with that gait and bearing peculiar to those accustomed to horses.

And whence has come the cargo, valued at £50,000, which they have so successfully brought across the seas? In Canada and America the agents of the Allies are buying suitable animals in enormous numbers. Russia alone can produce sufficient horses from her vast territories to meet all her requirements; and England, France, and Italy are compelled to supplement and conserve their reserves by huge purchases from colonial and foreign sources. A short while ago the export of horses from America averaged 25,000 a month, and of mules 6,700.

With headquarters in Canada, the English Remount Department is buying direct through its officers, with no middlemen; whereas France and Italy are relying upon local agents—men, of course, who are thoroughly conversant with their business. At the horse markets the agents sit on a raised platform, and the beasts are ridden before them, very frequently by picturesque cowboys, who pick out and catch the mounts from the herd by means of the lariat. Each animal must be free from vice and broken to saddle and bridle, and, although higher prices are paid by the British than the other Allies, our specifications are far more exacting, and ensure that we are obtaining the best horseflesh for our purposes that can be secured.

The horses we are purchasing are of three types—light for cavalry work, medium for the lesser calibre artillery, and heavy for the huge guns which modern warfare demands. Horse camps are scattered throughout the country, and the animals, tethered in long lines there, present a rough, listless appearance, contrasting vividly with their aspect a few weeks later, when the clippers have been at work, shaggy tufts of hair are trimmed into a smart, military shortness, and the vigorous training to which they are by degrees subjected has endowed them with springiness and an alert intelligence.

Although at the front the animals are more or less exposed to weather and the constant risk of shot and shell, statistics compiled in the spring of this year showed that the mortality—including even the retreat from Mons—was 15 per cent. per annum from all causes. In the South African War the mortality was between 55 per cent. and 65 per cent.

Naturally up to the time they arrive in England the horses have received no military training, but as soon as they are in condition that begins. They are taught to stand alone quietly, are gradually accustomed to sudden explosions, and are generally educated to acquit themselves reasonably well in the many startling situations which may unexpectedly confront them in the war zone.—*Sunday Chronicle.*

MILITARY HORSE SUPPLY.

COMMITTEE'S RECOMMENDATIONS.

IN August a Committee was appointed by Lord Selborne to consider what steps should be taken to secure the production and maintenance in England and Wales of a supply of horses suitable and sufficient for military purposes, especially on mobilization. The Chairman of the Committee was Lord Middleton, and the other members Mr. Chaplin, Sir Ailwyn Fellowes, Hon. A. Parker, Major Sir Merrik Burrell, Sir Gilbert Greenall, and Captain M. S. Adye. The Committee has investigated the matter fully, and issues a series of suggestions, which, if not new in their tenor, are applicable to a question that demands immediate consideration. The Committee says:—

In the course of our deliberations we have come to the following conclusions, and we beg to recommend:—

That the Board of Agriculture and Fisheries should—

(1) Institute legislation to require compulsory annual registration by the Board of all stallions that are travelled for a service fee or publicly exhibited for stud purposes.

(2) Increase the number of King's Premium stallions.

(3) Arrange for the inspection by their officers of stallions recommended for Board's Premiums.

(4) Continue the brood mare scheme in those counties in which it has proved a success, and purchase high-class mares for re-sale to selected breeders.

(5) Purchase stallions suitable for country service, and if opportunity for doing so occurs during the present financial year, arrange to obtain the requisite funds.

(6) Provide funds for the award of prizes for brood mares and foals.

(7) Arrange for a compulsory annual census of horses in as detailed a form as possible, and for more complete returns of horses exported and imported.

(8) Reconstitute the Advisory Council and County Committees.

(9) Appoint an expert staff of officers to supervise the scheme.

That the War Office should—

(1) Purchase a much larger number of horses in England and Wales.

- (2) Increase their horse peace establishments.
- (3) Purchase more horses direct from breeders.
- (4) Purchase remounts when rising four.
- (5) Purchase specially selected fillies and leave them with breeders until they have produced and reared foals.

Finally, we wish to express our entire concurrence with the contents of the following extract from a statement forwarded to the Board by the War Office in a letter dated April 16, 1914:—

"Without an adequate supply of suitable horses in civil life upon which to draw it would be impossible to mobilize the Army as it is now constituted, and if such a supply were non-existent we should be compelled at vast expense to maintain not only establishments constantly at war strength, but adequate reserves as well."

Unfortunately this supply did prove on mobilization to be inadequate for military purposes, and it appears to us, therefore, to be essential to the national welfare that steps should be taken by the Government to deal with the situation, and on comprehensive lines. We are aware that the adoption of our proposals will involve very considerable expenditure—and a progressively increasing one for a few years—but even if it eventually approximates an annual outlay of £100,000, the amount would be small compared with that expended by many Continental Powers, or with the sum that would be required if it were found necessary for the War Office to set up establishments for breeding remounts.

We fully recognize the need for national economy in every possible direction, but in view of the serious condition of the light horse-breeding industry of the country, we are of opinion that it would be false economy to defer taking action on the lines suggested.

The above summary is signed by all the members of the Committee, but Mr. Chaplin makes an additional report, in the course of which he suggests that:—

"Racing being the foundation upon which the light horse-breeding industry rests, in the reconstitution of any existing central authority, or in the creation of any new one in connection with the light horse industry, it would be an advantage if racing was represented upon it by more than one of the members; and it would also be well if British farmers, who comprise the largest number of breeders, should be represented upon it by one of their own class as well."

BOARD OF AGRICULTURE AND FISHERIES.
(Leaflet 304.)

HUSK OR HOOSE IN CALVES.

HUSK or hoose is a parasitic disease of calves caused by the presence of small thread-like worms in the tubes of the lungs.

Life-history.

The life-history of the parasite has not been completely investigated. The eggs and young worms which have been hatched out, are expelled by coughing, and by the bowels after the phlegm from the lungs has been swallowed. The worms live for some time in water or moist soil and probably undergo changes outside the body which enable them to live and develop when they gain access to the system of a calf. It is not known how the parasite reaches the lungs, but possibly the immature forms (eggs and embryos) are swallowed with food or water, and are carried to the lungs by the blood-stream. They develop into adult worms capable of producing young, and so give rise to a fresh crop of young worms. Although the actual cause of the disease is the parasite, external conditions favour its increase. Wet seasons (which favour the preservation of the immature forms), low-lying land, poor condition of the calves, and over-stocking, are all favourable to the spread of the disease.

Symptoms.

The symptoms depend to some extent on the degree of infection. The worms cause inflammation of the tubes of the lungs (bronchitis), and this results in a husky cough. Phlegm is coughed up, and in severe cases it may be mixed with blood; it often contains thread-like worms. In severe cases an animal may die suddenly of suffocation. Usually unthriftiness and a cough are the chief symptoms.

Treatment.

The treatment should be both (*a*) preventive and (*b*) medicinal:—

(*a*) If the pastures are very badly contaminated it may be good policy to plough them up and crop the land. Calves should be given a liberal diet and should be kept from pastures

on which infested animals have run, especially if the pastures have been over-stocked or are naturally damp and undrained.

(b) It is a popular belief that if volatile drugs, such as turpentine, are given by the mouth, the vapours are given off by the lungs, and exercise a poisonous effect on the parasites. While it is correct that the vapours of such drugs may be excreted by the lungs, the amount so excreted is never sufficient to affect parasites, and therefore treatment of this kind cannot be effective.

The injection of drugs into the windpipe, and fumigation by poisonous gases, give good results, but these methods should only be undertaken with the advice and under the supervision of a veterinary surgeon.

Whitehall Place, London, S.W..
October, 1915.

CONCLUSIONS ON TUBERCULOSIS IN CATTLE.

(1) REMOVAL of all tubercular cattle showing physical symptoms of any kind will eliminate from 25 to 40 per cent. of the open pulmonary cases.

(2) We believe that a physical examination, combined with an examination of animal secretions (milk, pulmonary secretions, faeces, vaginal secretions), will reveal nearly all the spreaders in a tubercular herd.

(3) A combined physical examination and guinea-pig inoculation of animal secretions add materially to the insurance against the introduction into healthy herds of open cases of tubercular cattle entering with a clean bill of health (tubercular animals that fail to react, or that have been treated to prevent a reaction).

(4) Among the tubercular cattle examined one cow in five was carrying tubercle bacilli in the oesophagus.

(5) Our results emphasize the principles laid down by Professor Bang, that in the suppression of tuberculosis reactors and non-reactors should not be kept together.

(6) Because of the frequency with which tubercular cattle spread tubercle bacilli from the bronchial mucous membranes, and because of the danger from buying such animals into the herd, it is strongly advised that all dairy cows be provided with individual mangers for feeding and watering.—*Report of the New York State Veterinary College.*

Correspondence.

MILK FEVER IN COWS.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—I am obliged for your kindness in publishing my recent communication on the above. With reference to your added comment upon it, with its underlying vein of sarcasm, I will feel doubly grateful if you will kindly insert this letter in your next issue.

In the first place, let me state very clearly that it was in no spirit whatever of adverse criticism that I referred to Mr. Mayall's treatment. No one reads this gentleman's contributions to our professional journals with greater pleasure and interest than myself. My chief aim was simply to recount as briefly as possible what has proved in my experience and practice a highly successful treatment.

I do not think it quite in the best interests of either the profession or our patients to argue that because the injection of sterilized air (an acknowledged specific) can be adopted by "any layman," the more mysterious pot. iodide treatment should be resorted to. Particularly as some practitioners consider the latter harmful in regard to the subsequent secretion in the udder. I may also say that the common remedy given by most country chemists to the layman who comes to them for advice is the very one to which you seem to think the necessary mystery attaches.

As regards the comparative costs of treatments, mine entails but the use of one cardiac tonic given hypodermically, and those cost 1s. 3d. *per dozen*. The violent stage which necessitates the administration of the more expensive chloral and pot. brom. does not occur in one of every twelve cases, therefore scarcely counts in general practice.

You ask, with reference to the teat tapes, "Why not twelve?" instead of, as I said, four hours. Well, simply because from practical experience I have obtained excellent results from four hours. You say I am evidently favoured in having nearly all uncomplicated cases. Might I suggest my treatment in the first instance prevents complications.

In conclusion, I would remark my fulness of description *re* cow's position, &c., is mainly attributable to the fact being impressed upon me frequently by my teachers—that it is always advisable, when dealing with professors or examiners, to give all the information you possess in detail. They might not take it for granted that you did know these minor, but important, details unless you told them so.

So that in laying stress on that, I showed, at the same time, two things I learnt as a pupil.

Yours faithfully,

PATRICK MACCORMACK.

Reviews.

The Principles of Veterinary Surgery. By Louis A. Merillat, V.S., Professor of Veterinary Surgery in the M'Killip Veterinary College, author of "Animal Dentistry and Diseases of the Mouth," late President of the Chicago Veterinary Society. Including an authorized Translation, Enlargement, and Rearrangement of "General Veterinary Surgical Pathology" by Professors C. Cadeac P. Leblanc, and C. Carrougeau, of the Veterinary High School, Lyons, France. Second edition. Revised and enlarged. Pp. 345, 114 figures in the text. Price 18s. net, postage 6d. Published by Alexander Eger, Chicago, and Bailliére, Tindall and Cox, 8, Henrietta Street, Covent Garden, London, W.C.

This is the second volume of the veterinary surgery of which Professor Merillat is the author. It has been written to supply the need of a surgical book furnished by and for the veterinarian, and to meet the requirements of the junior student studying the principles upon which sound surgical knowledge is based. It is divided into two main portions, the first consisting of eleven and the second of four chapters (being a translation of the French work "Pathologie Chirurgicale Générale," with enlargements and apt additions by the author). The matter in each individual chapter is well arranged, and the examples of various pathological conditions met with under the title of the respective headings are very comprehensive. Taking *gangrene* as an example, we get a definition of the condition, the cause, numerous examples met with in practice, the pathological anatomy, symptoms, and treatment. Two very valuable contributions are those on asepsis and antisepsis, and traumatisms. The veterinary surgeon who thinks he knows all about the former and considers that he always does his best to practise it may take a fresh view of his method of procedure after reading the author's words on the subject. If he cannot carry out all the indicated technique in general practice, yet he may gain useful hints for improved action. Much up-to-date information is included in the pages of the book on such matters as opsonins, serums, anaesthesia, and osteoporosis.

The restraint of our subjects for operation is an important matter, and the different methods adoptable are fully discussed. Apparently much greater use is made of the operating-table in America than in this country, and those practitioners fortunate enough to possess a table may obtain welcome wrinkles on things to know in connection with its manipulation and the fixing and freeing of the patient.

When dealing with anaesthesia and anaesthetics, the professor writes that "his experience with chloroform in carnivora has been disastrous." The illustration of the inhalation apparatus for dogs on p. 124 appears to us to indicate one of a very primitive type. There are much better ones used by British practitioners

which, we are sure, would be safer and lessen fatalities. We cannot teach Americans much, but we believe we are in advance of them over here as regards canine work. A timely word of warning is given as to the danger of chloroformization following cocaine injections.

Botryomycosis is hardly dealt with fully enough. Surgical interference in general practice is not always practicable, and often unsatisfactory from the owner's point of view, who wants his horse to work again quickly. Together with the internal administration of potassium iodide, we have had excellent results and a quick return of the horse to use by giving at the same time injections into the substance of the tumour of tincture of iodine, blistering its surface with biniodide of mercury ointment, and making a slight incision if necessary. We have many cases of equine botryomycosis to deal with in this country, and a good knowledge of how to treat it successfully is essential to the practitioner.

Rickets in animals is a very interesting malady to many veterinarians. The lines on the subject are well worth reading. In treatment of the defect the uses of bone powder and calcium phosphate are decried, as these substances are not assimilable. Chloro-phosphate of lime is recommended instead.

Our opinion of this book is very favourable. We cannot put forward all its good points in a short review. It is a mine of valuable information in a wide domain. The intellect of the practitioner who consults it will be broadened, deepened, and quickened, and if he reads it intelligently he will be able to understand and explain many of the trifling and important changes he sees in animal lesions and disease, and which hitherto perhaps he has occasionally been unable to account for. As an example, we have often seen slight necrosis in connection with the stitches in a wound. It never struck us until we read it in this book that the condition might arise from the pressure of sutures. The work is excellently bound and printed, and the illustrations in the letterpress are good.

It is not a book to be taken lightly, glanced through, and left, if the best is to be obtained out of it, nor can its contents be quickly assimilated. We can return to it again and again, and find each time some new and verifiable fact of interest. When we have incorporated all the knowledge contained in its pages, we shall indeed be veterinary surgeons fully equipped mentally in this special sphere.

G. M.

Animal Castration. By J. V. Lacroix, D.V.S., Professor of Surgery, The Kansas City Veterinary College. Pp. 140, 23 illustrations in the text. Price 7s. 6d., postage 5d. (Chicago: *The American Journal of Veterinary Medicine*. London: Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden).

This is the eighth number of the Veterinary Medicine series, issued with D. M. Campbell, of the *American Journal of Veterinary*.

nary Medicine, as editor. It is a handy, compact, and useful volume, with some good illustrations. It is conveniently divided into two main portions, dealing respectively with the castration of males and of females. The anatomy of the structures involved is described and the methods of castration denoted, and we notice that the use of the wooden clamp is only incidentally mentioned, and is not advocated or described. This is as it should be in an up-to-date book on the subject. The emasculator and the écraseur are the instruments recommended and used by the author in his operations. The emasculations of the horse, bos, sheep, swine, dogs, and cats and birds are described in the first section of the work, and the mare, cow, heifer, sow, bitch, and cat receive attention in the female group. A short appendix deals with equine umbilical hernia and Cæsarean section in the sow. With regard to ovariotomy in the bitch, we think that the flank operation is advantageous in some breeds of dogs, and under certain conditions is safer than the median line incision. It might have been advantageously described and illustrated. If Cæsarean section in the sow is important, then the same operation in the bitch is far more so, and we think it ought not to have been omitted. In castrating lambs, the safe course is to cut off a piece of the end of the purse, as good drainage is of vital importance in this case. Many men know little about the best way to castrate a full-grown ram, and the author does not enlighten them.

Whatever is included in the book is dealt with in a masterful manner. No superfluous verbiage mars the author's descriptions. His instructions and statements of procedure may be relied on. The book is one of the best we have read on the subject, and is a worthy successor to the volumes that have preceded it. Any practitioner who fancies himself as an animal castrator will benefit greatly by reading this little volume. It is up to date and essentially of a practical nature. G. M.

Journal of the American Veterinary Medical Association,
formerly the *American Veterinary Review*, November, 1915.
Edited by Pierre A. Fish, Ithaca, New York. Issued
monthly. Price 3 dollars per annum.

The American Veterinary Medical Association has purchased the *American Veterinary Review*, and with the title of "*The Journal of the American Veterinary Medical Association*" the monthly official organ of the national veterinary body is now appearing under the editorship of Pierre A. Fish, D.V.M. of Ithaca, New York. For about forty years Dr. Liautard, who is now in France, conducted the *Review* with conspicuous tact and ability, and the invaluable pioneer work which he did for veterinary education and literature in the States must ever stand as a monument to his name and fame. As a periodical run by veterinarians for veterinarians, the *Journal of the American Veterinary Association* ought to be assured of a full supply of intellectual and progressive clinical fare, the science of the pro-

fession will doubtless benefit, and a strong and influential instrument arise that will do its duty both in attack and defence. It is only by organization and united action that betterment of the conditions and influence of corporate bodies can be achieved. Politically and scientifically, a powerful press organ can do much for the men whose views, life work, and activities it delineates and espouses. There will be a useful and vigorous life before the new-born literary venture if the members of the Association rally round it and give it all the support in their power. We want, among other desirable things, to show the general public that we are entitled to be considered the equals of any other body of professional men, that we are learned, up to date, expert in our own line, capable of defending our honour and our field of labour, and ever ready to study and advance measures for the welfare of animals in health and disease. A well supported and largely circulated journal is an important factor in the achievement of these things, so we wish the new periodical all success and long life.

This November number of the new-born periodical is full of good things. The contribution on "Sutures and Suturing," a paper read before the American Veterinary Medical Association by J. V. Lacroix, is well written and shows how a simple everyday operation may be rendered interesting and instructive when treated by a master hand. The author thinks that veterinary surgeons ought to give far more consideration to the matter than is usual, and that suppurative and non-immobilized wounds should be much less frequent than they are. In the discussion which followed the tension of sutures, the material used, and the difficulty in the case of the cat were commented on. A paper that may be read with profit by all men interested in veterinary education is that on "The Value and Methods of Teaching the Fundamental Subjects in the Veterinary Curriculum," by H. S. Murphy. Some real live points are put before readers in this paper and the writer has evidently both a knowledge of human nature and of the science of teaching. We think teachers, like poets, are "born not made." The consideration of hog cholera in all its phases has a large share of the letter-press and would-be serum users can pick up many useful hints and learn much information on the matter from what is written. Clinical cases reported are interesting, but, as with us, not too plentiful. "Urinary Lithiasis in Bovines," by J. B. Jones, a paper read before the Association and followed by a discussion, shows how difficult adequate surgical procedure is in such cases and also indirectly invites to further improved procedure as regards the affection. Abstracts and Necrology appear in the issue, and altogether the publication is first class and a credit to all concerned.

G. M.

ARMY VETERINARY SERVICE.

ARMY VETERINARY CORPS.

CHRISTIAN names of temporary Captain Frank Septimus Clay are as now described.

Temporary Lieutenant G. S. Thomas to be temporary Captain; H. L. Somers to be temporary Lieutenant.

Major G. C. O. Fowler, retired pay, to be Major (temporary); Major G. C. O. Fowler to be temporary Lieutenant-Colonel.

Temporary Lieutenants to be temporary Captains: A. J. Sellers, D. O. Turnbull. To be temporary Lieutenants: G. H. Barber, G. W. Davidson.

Lieutenant-Colonels to be temporary Colonels whilst Dep. Directors of Veterinary Services: F. Eassie, D.S.O., G. M. Williams.

Temporary Lieutenants to be temporary Captains: H. S. H. Jones, W. P. Reid, S. E. Hill. A. W. N. Pillers, F.R.C.V.S., to be temporary Lieutenant.

Temporary Lieutenants to be temporary Captains: W. S. Reid, F. G. Rugg, W. D. Connachie. J. MacIlvenna to be temporary Lieutenant.

Captain R. D. Williams takes rank and precedence as Captain in the Army Veterinary Corps, T.F.

To be temporary Lieutenants: J. F. O'Grady, A. W. Allen.

Major (temporary Lieutenant-Colonel) A. England relinquishes temporary rank on alteration in posting. Major (temporary Lieutenant-Colonel) E. J. Lawson relinquishes temporary rank on alteration in posting.

The appointment of Lieutenant J. W. Tait, which was announced in *Gazette* of April 18, is cancelled. J. W. Tait to be Lieutenant (December 2).

W. H. Macfarlane to be Lieutenant.

Temporary Lieutenants to be temporary Captains: W. P. Power, A. Hoskins. C. J. Clifford to be temporary Lieutenant.

Temporary Lieutenant F. S. Clay to be temporary Captain.

Temporary Lieutenant A. Ellison to be temporary Captain.

P. D. Reavy to be temporary Lieutenant.

Temporary Lieutenants to be temporary Captains: H. H. Fetherstonhaugh, G. H. Pollock. Temporary Lieutenant H. S. Jones relinquishes commission on the termination of engagement.

Lieutenant J. P. Heyes to be Captain. J. R. Conchie to be Lieutenant. J. L. Taylor to be Lieutenant.

To be temporary Captains: Temporary Lieutenants G. Barry, T. M. Parker.

The following temporary appointments were made at the War Office:—

Assistant Director-General: Captain J. W. Rainey, Reserve of Officers, from Deputy Assistant Director-General, and to be temporary Major while so employed, vice Major A. G. Todd, A.V.C.

Deputy Assistant Director-General: Captain P. D. Carey, A.V.C., vice temporary Major J. W. Rainey, Reserve of Officers.

THE
VETERINARY JOURNAL

FEBRUARY, 1916.

Editorial.

ON PREFERENCES.

WHY, in the various activities of life, do men do things? Is it because, as a rule, they prefer to do them? Is the fount of their action governed by pleasurable inclination or their motive swayed by a happy enthusiasm? If it were universally so and each man got the work he loved a much better result would doubtless be gained in most cases and many more joyful faces and hearts would abound.

If we could each choose the task we liked or the walk in life we preferred our work would in many cases be done better, the line of advance in science, art, and industry would extend further than at present, on the plane of the unknown and unexplored regions. If we all loved the work we were engaged in we should persevere with it and be so sympathetically inclined towards it that it would be veritably impossible to do it badly or indifferently.

In this topsy-turvy world, however, we seldom get a choice of our vocation in life. Most of us are in the hands of precedent and circumstance, and it is with us as with the immortal Hobson "that or none." The lawyer oftentimes wishes he had been a doctor, the priest a soldier, the politician an actor, the bank clerk a sailor or a dentist, and the veterinary surgeon a farmer. They would probably do no better in altered vocations, but each man at some time in his life almost invariably thinks he could. However, we cannot easily change our lot, so we toil on in our special spheres and achieve a certain amount of ability or skill at our appointed work by reason of long practice, by thought and action, or, whisper it softly, occasionally by mechanical action with very little thought. Nevertheless,

the best cannot be attained unless the heart is in the work. No artist or scientist ever advances far or attains great heights unless he loves his task. Who would prefer "the long hours, the mean rewards, the ever-present uncertainty," and the soul-killing monotony of the average industrial worker if he had the chance of being a gentleman of leisure with an assured income, a well-paid singer of the nation's songs, or a renowned architect or engineer. There are many occupations that by their deadening effect on thought and spirit kill initiative. At the present time we think there is a great lack of inspiration and power of acute perception evident on all hands in intellectual fields. The material everywhere takes precedence of the spiritual. The amount of brain power many of us have is not half utilized. Can it ever be fully and usefully employed under present conditions? In many cases perhaps not. Yet the tragedies of life on all sides show us how widespread is the ass-like patience that accepts things as they are and never by thought and action endeavours to change them. We see the same man doing the same mechanical thing year in and year out until he sinks into oblivion often "unwept, unhonoured, and unsung." We ourselves are, at any rate, on a plane high enough for us to sympathize with and try to avoid a similar attitude and outlook towards our work to that of the man whose life is spent in cutting off bars of metal of equal length with a mechanical knife, with the woman who spends her days in hemming blouses at so much a dozen, with the minder who eternally follows the spinning jenny with its ever to-and-fro movement.

The surroundings of a man's calling, the sphere in which he acts, the conditions prevailing in and about his work have consciously or unconsciously to him an effect on his spirit, zeal and power of insight. With us much is in our favour. Almost all day long we have the heaven above us, fresh air (or as good as can be obtained) around us. We see the clouds, the sun, the moon, the stars. We experience the heat and cold, the balmy breezes and the biting blasts (for an unwritten law has decreed that all veterinary surgeons must go to and fro in open vehicles). The man who is nearest to Nature in her varying moods has the best chance of keeping his spirit fresh, his soul alive, and his intellect alert. The conditions are first-rate and there are not many other walks in life that we could prefer

that extraneously would confer more easily acquired or better benefits on us. Most of us make a mere living, nevertheless it is generally a livelihood, with not a few compensations.

Do we take full advantage of all the inspiration we are capable of absorbing? If we did, how great would our advances be. We consider scarcely any other calling would be able to give us points in the progress obtainable.

We sometimes think if all our past literature and history, our printed and written records, were destroyed and irrevocably consigned to oblivion that a great awakening might be evident in our profession. At any rate, the need for the exercise of brain power would be more evident; inquiry, investigation, insight, intuition, intellectual energy and vim, and all the things that tend to keep science and art at a high level and to permit it to advance triumphantly would bear on the present and not be scattered and dissipated on the arid, narcotizing and effort-paralysing fields of the past. "Living problems would be tackled by living minds. There would be no calling on the Dead Hand to help us."

If instead of "trying to rediscover things that had been already discovered and forgotten ten times over in the centuries of the past" we devoted ourselves to delving, mining, and diving into the things of the present, how much more profitable the occupation might be and how much greater the advance. With all our boasted present-day education and educational methods do we produce the best-finished article, do we put our learning to the most valuable application, do we give it the fullest chance to grow and expand? If we did we should prefer initiative to servile imitation, thought to dumb submission, the exploring of interesting by-ways and untrodden roads to the monotonous journeys over well-travelled ground. Misery, dull, lack lustre existence, soul-destroying monotony would vanish like the morning mist, as far as we were concerned. We should have preferred the better way and by single-heartedly following our own preferences we should attain to greater happiness and subconsciously perchance recognize in ourselves the quality which seeing in the cat we respect and admire, whilst getting rid of the dog-like attribute we all possess, but despise ourselves for possessing. It was not without thought that Old Egypt "made of the cat a god and of the dog a pariah."

Perhaps we have not stuck very close to our text in this editorial, but we prefer to leave it as it is, for "all a writer can do is to sow ideas about broadcast and trust to some of them falling on fertile soil."

G. M.

General Articles.

ON THE TRAINING OF VETERINARY SURGEONS FOR PUBLIC DUTIES WITH REFERENCE TO THE INSTITUTION OF A DIPLOMA IN VETERI- NARY STATE MEDICINE.*

By SHERIDAN DELÉPINE, M.B., C.M., M.Sc.

Professor of Public Health and Bacteriology, University of Manchester.

It has long been known to medical and veterinary pathologists that the control and prevention of infectious diseases must be based upon an exact knowledge of the etiology of these diseases, of the life history of the causal animal or vegetable parasites, and of the conditions favouring the transmission of disease and the occurrence of epidemics and of epizootics. It is now generally accepted that preventive medicine even in its most administrative aspect is based upon pathology, epidemiology, and epizootiology.

The importance of the diseases of animals that are communicable to man was early recognized by public health administrators; but while the public health service was in its infancy no adequate provision could be made for the administrative control of animal diseases. It, however, soon became obvious that the duties of medical officers of health did not allow them the time necessary to make themselves familiar with all the diseases of animals that are liable to affect man, and that sanitary inspectors from want of previous training could not be entrusted with this part of the work. It was then realized that the co-operation of the veterinary profession was not only desirable, but necessary. This appeared to us in Manchester so clearly indicated, that when in 1892 we were engaged in reorganizing the courses for the Diploma in Public Health, I suggested that provision should also be made for instruction in veterinary preventive medicine. This, in my opinion, was needed not only for the purpose of improving the means available for the prevention of human diseases, but also for the purpose of helping agriculturists in their efforts to reduce the losses due to diseases to which livestock are liable. The knowledge which had already been gained

* Reprinted from *Public Health*, September, 1914, the Journal of the Society of Medical Officers of Health.

regarding the causes of many animal diseases seemed to be sufficiently advanced to justify the establishment of a public veterinary service, somewhat on the lines of the public health service. The necessity of special training had been recognized in the report of the Departmental Committee on Pleuro-Pneumonia and Tuberculosis in 1888 (Part 1, p. xiii, paragraphs 55 and 56).

There were, however, differences of opinion upon the subject, and several of the leading members of the veterinary profession whom I consulted showed themselves adverse to the institution of post-graduate courses such as were contemplated. They urged that the veterinary students who had taken a full course of instruction for the membership of the Royal College of Veterinary Surgeons and obtained the ordinary diploma of the College were competent to undertake any of the duties connected with the public services. But in the course of the subsequent ten years various sanitary authorities realized the importance of having the assistance of specially trained veterinary officers, more specially in connection with meat inspection and the control of bovine tuberculosis. The same need was felt in agricultural circles. After careful inquiries and consultations, the University of Manchester decided to institute a post-graduate course in veterinary hygiene and preventive medicine, and to grant a diploma to members of the Royal College of Veterinary Surgeons who had attended satisfactorily the course prescribed by the University, and passed an examination corresponding in scope to the examination for the Diploma in Public Health. This scheme was realized in 1902.

Considering the fact that there was not at the time outside the Board of Agriculture any regular opening for specially trained veterinary officers except in connection with the Public Health Departments of counties and county boroughs, it was thought expedient to direct the teaching and examination towards those branches of veterinary State medicine that had a special bearing upon the prevention and control of the diseases of animals that are communicable to man. It was realized, however, that when other branches of a State veterinary service were organized certain additions would have to be made to the curriculum, so as to meet special requirements. It was not thought desirable to widen the scope of the course to such an

extent as to make it impossible for the students to obtain a *practical mastery* of the subjects selected for special study.

After careful inquiry, it was ascertained that under the prevailing conditions it would be useless to offer a course of more than nine months' duration (that is, a whole academic year), because there would be extremely few, if any, veterinary graduates who would be willing to incur the loss of time and money, which a course extending over more than one year would involve.

In the selection of subjects of study we were guided by the belief that what the average post-graduate student wanted most was to obtain a practical knowledge of (1) the scientific methods which are constantly needed in the investigation of the causes and phenomena of disease; (2) the practical application of the knowledge gained by these methods to the administrative control of disease.

With regard to students showing special aptitude for research, and desiring to do some special work, it was thought that the best way to meet their case was to offer them opportunities to carry out suitable investigations in the laboratory under the supervision of the staff. But the main object was to give the men attending the University post-graduate course a sound, practical knowledge of scientific and administrative methods which had proved of value or might become useful in the investigation and prevention of disease. This appeared to be the best way to prepare the men for the efficient discharge of the important and responsible duties that might be entrusted to them by public authorities.

In order to carry out this scheme, it was found necessary that post-graduate students should obtain their instruction not only from pathologists, bacteriologists, zoologists, chemists, and other laboratory workers, but also from veterinary officials engaged in administrative work in connection with the inspection of farms, markets, abattoirs, &c. The subjects which appeared most suitable for teaching of a practical character in the laboratory were comparative pathology, with special reference to the causes and mode of spread of disease, the life-history of the most important animal and vegetable parasites, the influence of various factors upon the occurrence and distribution of disease, and other subjects generally included in epidemiology or

epizootiology. It was also thought desirable to give a place in the curriculum to practical chemistry, more specially with reference to the analysis of water, air, soil, and various dairy produce and foodstuffs, not with the object of making the students competent analytical chemists, but rather for the purpose of making them familiar with the meaning of analytical results, and also in order to complete a part of their scientific training, which is often neglected at an early stage.

The scope of the instruction which it has been found possible to impart with some success during the last twelve years is indicated in a general way in the regulations of the University of Manchester as regards the subjects of the examination for the Diploma in Veterinary State Medicine. (The examination lasts four days, three of which are devoted to practical work and oral examinations.)

(1) Practical chemistry, with special reference to veterinary hygiene. (a) Methods of qualitative and quantitative analysis, with special reference to the examination of air, water, soil, and foods. (b) The principles of warming and ventilation. (c) Meteorological instruments and their use.

(2) Practical pathology, parasitology, and microscopy. (a) Practical bacteriology, including bacteriological analysis of air, water, foods, and soils. Disinfection and sterilization. Isolation and identification of pathogenic bacteria. (b) Recognition of animal parasites. Life-history of some of the most important animal parasites. (c) Morbid anatomy of lesions associated with parasitic diseases (characters of diseased meat). (d) Microscopical impurities of foods, air, and water.

(3) Comparative pathology of domesticated animals. Pathology of epizootic diseases and of diseases due to unwholesome food, air, water. Influence of housing, climate, season, soil. Geographical distribution of diseases. Artificial and natural immunity. Effects of heredity on liability to disease.

(4) Veterinary hygiene. Construction of stables, byres, piggies, kennels, &c. Hospitals, abattoirs. Methods of ventilation, drainage, disposal of refuse. Foods. Water supply. Methods of transport.

(5) Sanitary law and administration. Control of contagious diseases under the provisions of the Contagious Diseases of Animals Act. Statutes and by-laws.

(6) Inspection of meat, dairies, cowsheds, farms, &c. Sanitary reporting.

In the conduct of the examination the University has had the assistance of the highest authorities in the kingdom, viz., of Sir John MacFadyean and Sir Stewart Stockman.

That the institution of a post-graduate course in veterinary State medicine has met a want is shown by the fact that a number of men of high standing have taken advantage of the opportunities offered by the University, but the most convincing proof of the need which veterinary surgeons wishing to enter public service have of special post-graduate instruction has been given by the Royal College of Veterinary Surgeons, who have quite recently instituted a Diploma in Veterinary State Medicine* on lines similar to those which have been described above.

AIR-OXYGEN IN MILK FEVER.

By C. P. HYNES. M.R.C.V.S.

Lismore.

I, too, have read with much interest Mr. G. Mayall's article on "Milk Fever," especially his remarks on those cases which do not oblige us by running a rule-of-thumb course.

I have recently come across some of these instances, and one peculiar case was ushered in by violent shivering, the animal fighting gamely to keep her legs. While attempting to inject the udder she went down, and the treatment was completed in the prone position. This case responded to the treatment in the ordinary way, going on fairly well for a day or two, but then developed a "blow," with a temperature of 106° F., which persisted, in spite of febrifuge treatment, for more than a fortnight, accompanied by weakness of the hind limbs, loss of appetite, and disordered bowels. A second udder injection was tried without appreciable result; however, the cow eventually made a complete, though slow, recovery. I do not see anything very novel in Mr. Patrick MacCormack's treatment, as outlined in your last issue. It seems to me to be a bit of "the same again," and with the editor's somewhat restrained remarks thereon, 'nuff said. I think, how-

* The term "Veterinary State Medicine" was adopted by the University of Manchester, to indicate the fact that the object which the University had in view was the preparation of men for State and other Public Services in which a knowledge of Veterinary Medicine was of importance.

ever, that the editor's allusion to the simplicity of the air treatment and its ease of imitation by the observant layman deserves more than passing notice. The idea of self-preservation should be always with us, and no matter how we disguise this successful treatment, either by pumping the air through a bit of cotton-wool or other elaborate "contraption," it (the idea, not the air) eventually leaks into the mind of the owner or onlooker that your charm is "wind" from beginning to end, and "wind" alone.

Unless some efficient attempt is made to envelop the bicycle-pump procedure in unfamiliar trappings, we have only ourselves to blame if one fine day we read in every small town veterinary chemist's window an advertisement of "The great home cure for milk fever. Buy our wonder-working outfit. You work the ball and we do the rest," and exit Mr. Veterinary Surgeon from the realms of this disease. Mr. Mayall mentions that most of the "dopes" injected depend for success on their oxygen-producing properties, and admitting this premise as correct, I am tempted to give details of a simple oxygen-air treatment which has given me invariably satisfactory results, and at the same time clothed the air treatment in a more unaccustomed garb.

Granted the cow is down, which is generally the case, I have her turned over flat on her side, putting a good man to hold her head down.

With a rope the uppermost hind leg is tied well back to some convenient and solid object, the udder quickly stripped and the teats washed—the teats only, as I do not see the necessity of a general laundering of the organ. In the meantime the syringe (a plain rubber milk-fever syringe and syphon) is sterilized by boiling, and it is a good plan to let the instrument fill itself with water before dropping in to boil. A quart or so of a good claret-coloured solution of permanganate of potash in boiling water is now prepared—about what goes on a two-shilling piece to the quart will give a suitable solution—but if in these bad times the practitioner is not sufficiently affluent to take liberties with a florin, then a bronze coin—to wit, a penny may with safety be substituted. The crystals are carried in an ordinary ounce bottle, and conspicuously displayed thereon is a single poison label in red. This I find begets the wholesome respect of the inquisitive, and furnishes the imaginative practitioner with a fine opportunity

of giving an old dog a new name. If the solution is poured from jug to jug to cool or to help solubility, and the fine rich colour of the "pizin" is noted and inquired after—well, the I. P. gets another chance.

Out of a cup held by an assistant two or three pumpfuls of this solution is injected, beginning with the lower hindmost teat. The syringe is then withdrawn from the mixture, and instructions given that the valve end be held close over the same. Inflation then begins. Pump away till the quarter becomes well distended, at the same time observing that the syringe end is held close to the bath, snuffling, as it were, but not sucking up or pumping in any more of the solution. I hold that the udder gets purified air by this procedure mixed with a certain amount of oxygen, which we all know permanganate of potash in solution is so ready to give off.

Tapes or tyings are not used, but as the syringe is withdrawn the teat is grasped so as to imprison the oxygenated air for the time being. The quarter then gets a little massage, the teat is impinged upon itself sundry times, as Mr Mayall described, and the operation is finished, except for the remaining quarters, which are set about in a similar way. Superfluous gas certainly does immediately escape, but it does not seem to matter, as there is no doubt, from the results obtained, that more than enough remains. The cow is now released, trussed up on her sternum with bags of straw and well clothed with warm, dry covering.

Since adopting this air-oxygen treatment I have had very rapid recoveries and no bad udders. I am certain, too, that the owner is more impressed, less likely to copy, and "parts" more cheerfully than if the plain unvarnished atmosphere we breathe were summarily pumped in without attempt at concealment, and I flatter myself that the game is being played to the profession as far as speculating in futures goes. A hypodermic of cardiac stimulant (I also use P. D. and Co.'s cardiac tonic tab.) is certainly indicated in advanced or deeply comatose cases, where the body surface is cold and the temperature subnormal, but warm, heavy, dry coverings heated before the fire also play an important part here. I find that the stomach and bowel functions run all fours with the rapid recovery, and assert themselves quite time enough to obviate the necessity of that delightful operation known as "back-raking," which to my mind savours strongly of the Empirical Ante-Schmidt Generation, when something had to be done to show the practitioner's energy and anxiety to ward off the inevitable dissolution.

Abstracts.

BOVINE TUBERCULOSIS IN MAN.*

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AND

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THERE never was a time when it was so necessary to take stock of the nation's living possessions; never a time when it was so essential as it is now to raise healthy strains both of man and beast. Tuberculosis continues to contaminate these strains. It is true that the amount of contamination is decreasing, but there still remains an enormous task to be accomplished before either physician or veterinary surgeon, farmer or social economist can rest on their oars. For the past three years a campaign against tuberculosis has been actively waged all over the country. Curative measures, measures directed towards the alleviation of human beings already affected have been most in the public mind. Curative methods there must be: the tuberculous worker must, if possible, and as soon as possible, again assume a position of economic independence. It is not the business of this paper to discuss these methods but to bring forward the evidence of many investigators upon the important position in the whole problem of bovine tuberculosis in man. No number of beds in sanatoria and hospitals will ever suffice to stamp out tuberculosis in human beings unless the sources of infection are attacked. It is not in dispute that there are two main types of the tubercle bacillus—the human and bovine. What was in dispute for some time was whether the bovine bacillus could cause disease in man.

Koch at the International Congress on Tuberculosis in 1901 startled the scientific world. He asserted that man was practically never infected by bovine tuberculosis. Subsequent research has shown that this statement is erroneous.

Koch, of course, realized that to show that cattle or pigs

* This paper was first published in *The Reading University College Review*, vol. v, No. 15, August, 1913.

October 11, 1915.—Since its first issue much new work has been carried out on the subject with which it deals. It has therefore been revised and brought up to date as it is felt that the subject matter is of urgent interest at the present crisis.

Note.—Tuberculosis as it affects man is divided into (a) pulmonary tuberculosis, that is to say, tuberculosis of the lungs, "consumption," or "phthisis," and (b) "other forms of tuberculosis," that is to say, tuberculosis affecting any other part of the body but the lungs.

were not susceptible to human tuberculosis was no proof that the reverse may not occur; he therefore proceeded to discuss the evidence for human infection by cattle. As no direct experiments could be carried out he discussed indirect evidence. "It is well known that the milk and butter consumed in great cities very often contain large quantities of the bacilli of bovine tuberculosis, and unintentionally carry out the experiment which we are not at liberty to make. If the bacilli of bovine tuberculosis were able to infect human beings, many cases of tuberculosis caused by consumption of alimenta containing tubercle bacilli could not but occur among the inhabitants of great cities, especially in children. And most medical men believe that this is actually the case. In reality, however, it is not so. That a case of tuberculosis has been caused by alimenta can be assumed with certainty only when the intestine suffers first, i.e., when a so-called primary tuberculosis of the intestine is found. But such cases are extremely rare." Professor Koch then cited statistics; he said that he himself had only seen primary tuberculosis of the intestine on two occasions, that Biedert had only found it sixteen times among 3,104 *post-mortems* of tuberculous children. "Primary tuberculosis of the intestine, especially among children, is a comparatively rare disease, and of those few cases that have been enumerated, it is by no means certain they were due to infection by bovine tuberculosis, it is just as likely that they were caused by the widely propagated bacilli of human tuberculosis." That then was Professor Koch's position—that cattle could not be infected by tubercle bacilli of human origin, and that since primary tuberculosis of the intestine in man was extremely rare, it was very improbable that man, considering his many opportunities of infection, was liable to bovine tuberculosis.

It may be said at once that the statistics quoted by Professor Koch concerning the frequency of primary tuberculosis in children do not correspond with those obtained in this country. Woodhead, Shennan, Guthrie, Still, Ashby, and Carr have published the results of the *post-mortem* examinations of 1,161 tuberculous children; primary intestinal tuberculosis was found in 286 = 20·30 per cent.

Those who listened to Professor Koch realized the gravity of his statements. Professor Nocard pointed out that M. Chauveau

had infected cattle with tuberculosis from human sources. He stated that the results of such inoculation varied very much: "In certain cases one succeeds and in more frequent cases one does not succeed." He thought failure was due to the transference of the organism from a favourable to an unfavourable soil. He also showed that there were numerous well-authenticated instances in which human beings, especially veterinary surgeons, had been "inoculated while making *post-mortem* examinations on tuberculous cows." "Then the disease has remained unnoticed for several months, but it has revealed itself sooner or later; its course has varied according to different circumstances, but it has finally appeared. Some of them have been cured; we have a colleague, also a veterinary surgeon in Copenhagen, who is an example of its curability. Others are dead, having watched step by step the progress of the disease from the moment of inoculation to the summit of the corresponding lung." Professor Bang pointed out that although "there is little danger of infecting cattle from tuberculous men it is not always certain that the opposite conclusion is right." "I fear Professor Koch has gone a little too far when he speaks of the non-necessity of taking measures against the tuberculosis of cattle. I fear his opinion will be rather detrimental to the work which goes on in many countries in order to procure healthy milk for the public." There is no doubt that Professor Bang was right, and that Professor Koch's statement has retarded by many years measures for the improvement of the milk supply of this country.

Professor Sims Woodhead pointed out that Crookshank had been successful in producing tuberculosis in a calf, using the sputum of a tuberculous patient. He very wisely added that the matter was of very great importance, and "we cannot settle it by talking about it; it is only by careful experiments carried out on very definite lines that we can convince ourselves of the accuracy or insufficiency of Professor Koch's statements." He further suggested that a commission should be formed to investigate the matter. In the last fourteen years a large body of evidence has been accumulated which seems to prove that a certain proportion of tuberculosis in man is due to the bovine type of bacillus. This evidence may be divided up into two main groups, (a) experimental, (b) statistical. The experimental

evidence must clearly be of two sorts: first, the proof or dis-proof that tuberculous material from human beings can infect cattle; and, second, that man can be infected with tubercle bacilli of the bovine type.

The Royal Commission in their Report of 1907 stated that they had studied the nature of the tuberculous material obtained from sixty cases of the disease in man. They found that the organisms obtained divided themselves into two main groups. Group I comprised fourteen strains out of the whole number which were capable of producing generalized tuberculosis in calves and rabbits. Group II consisted of forty cases; these produced a more or less localized lesion—never a generalized tuberculosis either in calves or rabbits. The remaining six cases showed characteristics which made it impossible to include them in either of the two main groups. The conclusion seems inevitable that both man and cattle may be infected by the same organism. If this conclusion be true it is necessary to consider the route by which the bovine type of bacillus penetrates man and the material in which it comes. The answer to the first question is to be found in the work of many people, thus in the Report of the Royal Commission on Tuberculosis it is stated that the tuberculous material of Group I was supplied to the Royal Commission in the form of glands from the abdomen or neck; and when the details of the several cases were studied it seemed that the bacillus found an entrance into the body by way of the alimentary canal; now the spread of tuberculosis from man to man is generally held to take place mainly through the respiratory passages, but very different are the conditions determining the entrance into the human body of bacilli coming from a bovine source. The opportunities for the transmission to the body by the respiratory passages of the air-borne bacilli coming from the lungs of a tuberculous cow are insignificant compared with the abundant opportunities for the transmission to man of tubercle bacilli present in cow's milk. That infection of distant tissues may occur through the intestinal tract is seen continually in typhoid fever, in which disease the organisms taken with the food or drink may be found circulating in the blood during the first week of the disease. Calmette and Guerin, Calmette and Petit have conducted many experiments which show that infection through the intestinal tract may readily occur, and

that organisms introduced into the intestinal canal may be found circulating in the blood within six hours of their introduction. It must be admitted that infection through the intestinal tract is by no means an impossible occurrence.

Later research has shown that in considering the intestinal tract, we must consider rather the whole alimentary tract, including teeth and tonsils.

Stiles, in a valuable paper read before the National Association for the Prevention of Consumption at Leeds in 1914, stated that "the human bacillus is inspired: the bovine bacillus is ingested. Both have access to the tonsils. In swallowing tuberculous milk the bacilli are squeezed into the little pockets of the tonsils, where they multiply and then pass to the upper glands of the neck." Mitchell examined the tonsils from seventy-two such cervical glandular cases. In 37 per cent the tonsils showed evidence of tuberculosis under the microscope. In twelve cases he isolated the bovine bacillus; in three the human bacillus. There is, therefore, good evidence to show that if the tubercle bacillus be brought in contact with the alimentary tract it can penetrate the human system and produce disease. There is only one material that passes from the cow to man in such a form and in sufficient quantity to be able to produce an appreciable amount of chronic disease. That material is uncooked milk of which we in this country probably drink more than almost any other nation in Europe. Is there any evidence that there are sufficient tuberculous organisms in milk to give rise to a constant stream of cases of bovine tuberculosis. The following table gives the figures obtained in some of the large towns:—

TUBERCLE BACILLI IN MIXED MILK SAMPLES (PERCENTAGES). (Savage).

	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Manchester	8·7	8·57	10·42	6·7	6·15	6·2	5·74	8·28	5·14	—
Liverpool, country samples	6·1	7·3	5·1	9·2	3·8	6·8	4·7	3·3	1·8	4·1
Liverpool, town samples	0·6	0·4	0·8	1·5	0·4	1·4	1·5	2·0	—	1·4
Sheffield, country samples	—	17·8	16·7	6·7	14·7	9·6	9·7	9·9	10·9	10·4
Birmingham, country samples	—	—	—	—	—	—	—	—	—	—
Leeds, country samples	—	—	—	—	—	—	—	11·3	7·5	7·3
Sunderland	—	—	—	—	—	—	2·5	25·3	16·4	—
London (L.C.C.) ...	—	—	—	—	—	—	—	11·6	7·4	3·6
					Prior to 1908 = 14 per cent.				10·4	

If an average be taken of these with other large towns between 9 per cent., and 10 per cent. of the mixed milks are found to contain tubercle bacilli. In places in which there is inadequate veterinary inspection the proportion of infected samples is very much higher.

Thus Mitchell found that in Edinburgh 20 per cent. of the samples taken from milk on sale at the milk-shops contained living tubercle bacilli, and Stiles in his paper stated "most emphatically, that in Scotland 75 per cent. of the surgical tuberculosis is due to infected milk." Earlier in the paper he mentioned that 50 per cent. of his cases in the Edinburgh Children's Hospital were cases of surgical tuberculosis. Stiles based his estimate of the percentage of bovine tuberculosis upon the careful investigations by Fraser and Mitchell of the material derived from cases upon which he himself operated. There is no doubt the milk of this country does contain living tubercle bacilli. To what extent does infection take place? The answer to this question should be twofold: first, the demonstration of the bovine type of bacillus in tuberculous material derived from sick persons; and second, if the source of the infection be milk that those who drink most milk are the worst sufferers.

The work of Park, Krutnwieke, Fraser, Mitchell, Eastwood, F. Griffith, and A. Stanley Griffith shows that man can be infected by the bovine type of bacillus, and that the most intense infection is amongst the chief milk drinkers.

A. Stanley Griffith examined material from thirty-five unselected tuberculous cases occurring in children between 0 and 12 years and found six bovine infections, twenty-eight human, and one mixed infection. It is interesting to note that all the cases of bovine infection occurred in children between 1 and 4 years, i.e., at the period when cow's milk forms the chief diet.

Eastwood and F. Griffith investigated this question from another point of view. They obtained *post-mortem material* from institutions within the county of London from 150 children dying from all causes between the ages of 2 and 10 years. Ninety-four showed evidence of infection with tubercle bacilli, and from seventy-eight of these cultures were obtained. It is important to note that in five of these cases *cultures were obtained*, though no demonstrable lesions of tuberculosis were found. In sixty-five of the cases evidence of infection with the human bacillus was obtained: fifty-two of these infections had proved fatal ones.

In thirteen of the cases evidence of infection with the bovine bacillus was obtained: nine of these had proved fatal to the children.

The investigations quoted all tend to show:—

(1) That a definite proportion of tuberculosis in man is due to the bovine type of bacillus, that this proportion is highest in the young (0-5), not quite so high but still very appreciable in those from 5-16. From this age period upwards it becomes a constantly diminishing factor (Park and Krumwiede).

(2) That in some districts at least the proportion of bovine infection in certain types of tuberculous disease in children is very high, thus Fraser, working in Edinburgh, found the bovine type in 58 per cent. of the cases of tuberculous disease of the bones and joints which he investigated. Mitchell, also working in Edinburgh, found it in 90 per cent. of the cases of tuberculous infection of the glands of the neck.

(3) That in other districts the proportion does not appear to be so high. Thus Eastwood and Griffith from seventy-eight cases obtained from institutions within the county of London found 16·7 per cent. to be due to bovine infection. Stanley Griffith—the source of the material is not stated—found 17·6 per cent. of bovine infection.

The persons, then, who show bovine infection are those who drink most milk. Is it possible to show that partly as the result of measures to insure a much less infective milk supply the death-rate from tuberculous disease other than pulmonary is falling more rapidly than the death-rate from pulmonary tuberculosis? Let us consider some of the figures. Sir George Newman, Chief Medical Officer of the Board of Education, gives in his Report for 1914 a valuable table compiled by Dr. T. H. C. Stevenson. This table shows the mortality in England and Wales from all causes and from tuberculous diseases during the period 1907-14. If we take the figures for 1914 as equivalent to 100 the following facts emerge:—

DEATH-RATE PER 1,000 LIVING.

1.— <i>At all ages</i> —		1907	1914
(a)	All causes	... 107·5	... 100
(b)	Other tuberculous diseases	... 127·7	... 100
(c)	Phtisis	... 132	... 100
2.— <i>Ages 1-5</i> —			
(a)	All causes	... 125·6	... 100
(b)	Other tuberculous diseases	... 127	... 100

From this we may conclude that the diminution of the death-rate at all ages from those forms of tuberculous disease chiefly produced by milk has not been quite so great within the years under consideration as the diminution in the death-rate at all ages from tuberculous disease of the lungs. If we take the period 1-5 it is seen that the fall in the death-rate from all causes has not been quite so great as the fall from "other tuberculous diseases." These figures apply to England and Wales. Can it be shown that in a community where active precautions are taken to supervise the milk supply better results have been obtained?

For many years the milk supply of Manchester has been very carefully controlled, and the percentage of mixed milks showing tubercle bacilli has been reduced from 17·2 per cent. in 1897-8 to 5·14 per cent. in 1909. Professor Delépine, who is responsible for the work, has published figures to show that the death-rate from tuberculous diseases other than pulmonary tuberculosis has diminished in Manchester at a greater rate than that for all other causes and for pulmonary tuberculosis. He assumes that the improvements in general sanitation, &c., affect the general death-rate, and the death-rate from pulmonary tuberculosis, as much as they affect the death-rate from other tuberculous diseases, and that if he can show that the reduction in the mortality from tuberculous diseases other than phthisis is proportionally greater than the reduction in the mortality from phthisis, and from all causes, it is reasonable to claim that this result is in all probability due to improvement in the milk, and the amount of that improvement may be taken as a basis for an approximate estimate of the share taken by bovine tuberculosis in the infection of human beings. Some of Professor Delépine's figures are summarized in the following tables, in which the average death-rate for 1906-10 is called 100, the death-rates at the other five-year periods are expressed in terms of this figure.

MANCHESTER (ALL AGES).

Deaths		All causes		Phthisis		Other tuberculous diseases
1881-1885	...	133	...	146	...	156
1886-1890	...	136	...	106	...	161
1891-1895	...	133	...	126	...	164
1896-1900	...	128	...	123	...	139
1901-1905	...	113	...	117	...	120
1906-1910	...	100	...	100	...	100

From these figures it would appear that there has been a greater saving of life in other tuberculous diseases than is the case in either of the other two groups; it also shows that whereas the deaths from other tuberculous diseases increased in number from 1881 to 1895, there has been a steady diminution in the last fifteen years; in fact, just at that period when the active measures taken against infection might be expected to produce some effect. If we examine the statistics for the age period 0-5, it is found that there is again a greater fall in the death-rate from other tuberculous diseases than from all causes; at this age period the deaths from pulmonary tuberculosis constitute so small a fraction of the whole as not to be comparable.

MANCHESTER (AGES 0-5).

Deaths	All causes			Tuberculous diseases other than pulmonary tuberculosis	
1881-1890	163	...	193
1891-1895	143	...	198
1896-1900	144	...	161
1901-1905	120	..	127
1906-1910	..	.	100	...	100

These statistics seem to show that where a genuine effort has been made to deal with the problem of tuberculous milk, there a definite gain is effected; they must not, however, be too literally accepted, for, apart from other outside influences, the same difficulty arises that is present in the consideration of the returns of the Registrar-General, that we do not know what proportion of deaths from other tuberculous diseases is due to the bovine type of bacillus and what to the human. On the evidence at present available from one quarter to one-third is bovine. If we take it at the lowest estimate, we find that the bovine type of tubercle bacillus is the cause of about one-fourth of the cases of other tuberculous diseases at ages 0-16; that is to say, about 3,000 deaths a year. It is usually supposed that for every death there are at least ten persons suffering from the disease. If this be so bovine tuberculosis is responsible for 30,000 cases of illness at any one time. What this may represent in monetary loss it is impossible to estimate accurately, but it will be well within the mark to say not less than £300,000 per annum. What it represents in pain and suffering and ultimate loss of earning capacity only those who have to deal with the disease can realize.

SUTURES AND SUTURING.*

By J. V. LACROIX.

Kansas City, Mo.

FOR the purpose of joining tissues wherein there has been effected solution of continuity, sutures of some kind have long been employed to procure prompt coaptation of wound margins. The term "suture" is applicable to material employed in the process of joining tissue as well as to the joined structures after coaptation has been effected; consequently, in one sense, there is no great difference in the significance of the terms "sutures" and "suture materials." We shall limit our consideration of suture materials to those commonly employed.

Suture materials are of vegetable, animal and metallic origin. Of vegetable origin we have linen thread put up for use in various ways, and this constitutes a very strong and durable agent that is particularly serviceable in uniting surface wounds in thick-skinned animals. Linen thread is very effective when employed as a ligature for bulky masses of tissue, but it becomes very dense after having been *in situ* for a few hours and is quite prone to cut through tissue encompassed when tension is great. However, it is a very serviceable material for emergency work upon the large animals and does not become absorbed even when buried in the tissues. For the purpose of reinforcing marginal sutures, linen tape is very useful, since because of its shape, it does not readily cause pressure necrosis under tension.

Of animal origin, the materials usually employed are gut, kangaroo tendon and silk. Gut is very frequently employed and when not treated in any one of the numerous ways to retard its absorption, will become absorbed in a few hours. The time required for its absorption depends upon the character of the tissues containing it and the size of the suture material. Tissue that is vascular and that tends to keep sutures in a moist state, will absorb sutures earlier than will tissue that is not so well supplied with vessels. When it is desirable to have a gut suture remain in position for several days, it is treated by being chromicized, or iodinized, or otherwise rendered more dense. Used in the approximation of some sub-surface wound margins, it is very dependable.

* Presented at the meeting of the A.V.M.A. Section on Practice, Oakland, Cal.

Where there exists material retraction of heavy muscular or tendinous structures attending accidental or intentional division of same, heavier suture materials are employed for effecting coaptation of the retracted margins or ends. For this purpose kangaroo tendon or other prepared fibrous animal tissue is used. However, in the use of buried sutures, regard must be given the vascularity and bulk of tissue sutured and the amount and size of the material employed. Where tissue is vascular and tension is great, necessarily strong sutures are required. Buried gut sutures may be so inserted that because of unequal distribution of tension anaemic necrosis caused by pressure is the result. Likewise an excessive amount of suture material will produce a similar effect.

Silk suture material, because of its strength and soft texture, constitutes a valuable agent for almost any case where suturing is indicated. For intestinal work or fixation operations where there exists malposition of viscera of small animals, silk is very useful. For the reduction of certain herniae in the large animals, heavy braided or twisted silk suture material is often employed. Silk sutures may be buried when used for approximation of sub-surface tissue, and the superficial structures can be brought together with a separate suture, and there results little or no disturbance because of the presence of this buried material if sterile.

Metallic suture materials usually employed are silver and copper wire. We shall not here consider steel in any form, nor aluminum or gold plates, which are serviceable in bone surgery. For the purpose of approximating margins of cartilage when wounded, metallic sutures are very serviceable; many veterinarians employ wire for the closure of abdominal wounds of small animals in order to insure their being left *in situ* should the subject be inclined to molest the wound. In certain fractures of the jaw in the horse, copper wire may be employed to good advantage; it may be wound around the base of teeth, thereby immobilizing the affected parts.

In addition to affecting approximation of tissues that have been divided, sutures are useful in many instances in that they are the means of joining the margins of the skin where wounds have been inflicted, and in this manner there is made use of a natural protection for the underlying tissues, which would otherwise need to be protected by means of dressing material of some sort.

To render possible primary union of tissue, perfect apposition of wound margins with complete immobilization of the structures in the immediate vicinity is essential, and the use of some kind of suture material is necessary. While in some instances it is possible to bring about this result by the use of bandages or other appliances, such measures in veterinary surgery are applicable only in wounds of the extremities.

For the purpose of accomplishing prompt healing of wounds and lessening the amount of granulation, sutures are of service even though perfect coaptation of wound margins is not effected. It is possible to train toward the normal position with sutures tissues that have been divided in such manner that approximation of the divided portion is impossible, and the result of such suturing is very desirable in some instances. An example is the suturing of the divided portions of the extensor carpi-radialis where the distal portion has been detached from adjacent structures and considerably mutilated. In such cases by retaining in a suitable position the lower portion of the tendon for a week or ten days, the tissues are trained in such manner that excessive granulation with resulting unnecessary blemishes is avoided if subjects so affected are given proper after-care.

To make possible primary union of skin and fascia protecting the sub-surface from exposure and thereby obviating danger of exuberant granulation and in some instances suppuration, sutures which approximate the margins of the skin and fascial wounds with reinforcing sutures to prevent pressure necrosis and tearing out of the marginal sutures, constitute a very practical method of treating many wounds. Where fibrous growths are removed from horses' shoulders by means of approximation of the skin and fascia, primary union of same results, and complete recovery in from two to four weeks without exposure of the underlying tissues and without suppuration, is possible. Contrast this with a similar surgical wound that is left exposed to heal by granulation.

Recently the writer removed a fibrous mass from a horse's shoulder, and facilities were not at hand for the execution of a good technique from the standpoint of asepsis. The subject was not confined except with halter and twitch; the hair was clipped from the surgical area and the parts painted with tincture of iodine; a local anæsthetic of cocaine was used, and the fibrous

tissue was removed. An opening for drainage was made, the upper part of which was 2 in. below the lower commissure of the margins of the wound made for extirpation of the fibrous tissue; and the larger opening was firmly untied by means of a glover's suture. The cavity was packed with sterile gauze which was left in position for twenty-four hours. After-care consisted in cleansing the drainage wound daily to allow free discharge of wound secretions. The horse was kept on pillar reins for ten days. Primary union of the apposed wound margins occurred in this case, which proves that with ordinary care such results should be the rule and not the exception in general practice.

For the control of haemorrhage by ligating vessels singly or by ligating *en masse*, some kind of suture material is necessary. In diminishing nutrition of the parts involved in degenerative changes, such as certain forms of goitre in dogs and in mammary tumours of sows, good results are accomplished by ligating the parts affected *en masse* with a material of linen or silk, whereas in some instances radical surgical removal would fail to bring about the desired effect.

For surgical purposes, suture material is sterilized and kept so while in suitable containers, and when employed by the veterinary surgeon under certain conditions, care and skill are necessary to prevent its contamination. It is a regrettable fact that among veterinarians comparatively little suturing of surgical or traumatic wounds is done in a manner to make possible wound repair with little or no suppuration. With haemostasis and perfect coaptation and almost complete immobilization of surgically clean wound margins with provision for drainage where necessary, primary union of the contacting surfaces is the usual outcome. If tension upon sutures is not too great and where immobilization of wound margins is possible by means of reinforcing sutures of some kind, prompt and complete repair of wounds necessitating little or no after-care, is the result. The extra time and skill required in the execution of such technique is justified when after-care and results are considered.

For sub-surface coaptation of tissue, several rows or tiers of prepared gut when employed as continuous sutures are preferable to other means of suturing. With continuous sutures, a maximum degree of tension distribution is attained, and comparatively little time is consumed in suturing. However, the average

veterinarian habitually employs interrupted sutures in many instances where a continuous suture would be preferable. The use of a buried, continuous suture in laparotomies of small animals precludes all possibility of hernia, and where in some instances the buried suture prevents primary union of all of the surface margins, this causes no serious inconvenience to the subject.

There is no better example of the good effects to be derived by the proper employment of sutures or of the improper use of same than the contrast between the time required for complete recovery of a patient operated upon for the removal of a large shoe boil and so treated that primary union of the skin results in one case and healing by granulation takes place in the other.

An exposed granulating surgical wound is an exhibition of unskilful and barbarous methods practised by veterinarians, who should give some real thought and effort to the improvement of their way of treatment of wounds both surgical and traumatic so that their methods of handling may become more humane and more practical.—*Journal of the American Veterinary Medical Association.*

WARBLE-FLIES.

PROTOCOLS OF EXPERIMENT.

THE calf used for the experiment was born on September 28, thus excluding the chance of having been attacked by warble-flies.

Calf "A."

On December 1, twelve larvæ were extracted from the gullets of two steers. These were carefully removed so as to avoid injury. As each was extracted, it was placed between two folds of the gullet and kept in a warm place. The removal of the larvæ took about half an hour.

An incision was made in the right hind quarter of this calf, and the larvæ were dropped one by one into the pocket. The wound healed rapidly, and no traces of the larvæ were seen until February 2, when four warbles were discovered on the animal's back. All except one were on the right side. Two of these became absorbed later and two remained until after March 10, when they also gradually became absorbed.

Calf "B."

On January 25, twenty-six second-stage larvæ were secured as in the preceding experiment from four different gullets. They were placed in a pocket on the left hind-quarter of a November calf. On February 2 several warbles could be felt on this animal's back. One of them was squeezed out to make sure. Later, eleven of them pierced the skin all along the left side of the back. However, these died subsequently one by one and were absorbed; on March 10 only the punctures which they had made were visible, and all swelling had subsided.

The object of these experiments was mainly to find out if the second-stage larvæ taken from the cesophagus and thus interrupted in its life-cycle was capable of completing it in another animal. Experiments have been conducted by Koorevaar, who introduced larvæ beneath the skin of dogs and rabbits, and found them fourteen days later in various parts of the body, including the spinal canal and the walls of the gullet (quoted by Carpenter). Hence, Koorevaar concluded that the maggots reach the gullet, or spinal canal, after extensive wanderings through the tissues of the ox or calf, and that they do not travel to the gullet by way of the mouth. This theory appears to me to be the most likely, and the experiment with calf "A," given above, helps to support it. In this experiment the larvæ were not seen for a period of eight weeks, when four of them were noticed on the calf's back; and it is certain that they were, during this period, in some unknown part of the animal, possibly in the gullet (?).

In the case of calf "B" the larvæ were interrupted in their life-cycle at a later stage, and it may be that they were too far advanced to return to the gullet and not sufficiently mature to migrate to the back. For this reason they did not develop fully. It was noticeable, however, that in calf "A" two of the warbles were larger, and it looked for a time as though these larvæ would reach maturity.

In a recent article by Carpenter and Hewitt the authors quote Glaser, who states that the newly hatched larvæ he had under observation died in one and one-half hours if left in dry air, but that within an hour after hatching they could be revived by transference to water, in which they would live for two days. He concluded, therefore, that they need moisture for their further development, and that they would obtain this in the gullet.

Newly hatched larvæ, placed by him in the shaved skin of an experimental calf, made no attempt to bore through. One young maggot, however, hatched from an egg laid on his trousers by a female *Hypoderma lineatum* in June, bored through the skin of his own leg and disappeared in one and three-quarter hours, leaving a small round red spot visible externally. Four or five days later the larva could be felt through the skin, having grown to a length of 2·5 mm. Then it apparently worked its way upwards, for early in September swellings were apparent on the hip and abdomen, and at the end of that month a swelling at the lower end of the gullet was indicated by pain when swallowing. This moved quickly up the gullet, and, on October 2, Glaser had the satisfaction of extracting a warble maggot, 7·5 mm. long, from his own mouth.

"This involuntary experiment tends to show that a warble larva can bore through the skin of the leg and work its way into the gullet in the human subject, and that the insect might pursue the same course in the ox. As mentioned in the introduction to this paper, the experiments with muzzled calves tried during several years at Ballyhaise, show that animals, apparently unable to swallow either the eggs or the young larvæ of *Hypoderma*, are at the most but partially protected from infection. The strong mouth-hooks and piercer, and the well-developed spiny armature of the newly hatched maggot, suggest that it could, perhaps, bore as readily through the skin as through the mucous coat of the gullet, and we may eventually find the former to be, after all, the usual mode of entrance."

The quotation just given supports my own ideas on the subject that the newly hatched larvæ penetrate the unbroken skin. I have already shown that the egg is laid on the legs of the animal and attached to the base of a hair next the skin. This has been confirmed by Professor Carpenter. The parts where the eggs are deposited are not easy of access to a cow's tongue, and the hair covers the egg completely. Glaser mentions the fact that moisture is necessary to keep the larvæ alive; there are many opportunities for a cow to wet her legs during a summer's day, such as the dew in the morning, or when drinking; and the skin and hair would remain moist for a considerable period. In Glaser's experiment the larvæ were placed upon an area of shaven skin, but in Carpenter's abstract of his work no mention is made

about supplying moisture. Possibly the failure of the larvæ to bore into the shaven skin may be attributed to the lack of moisture. In any case an experiment such as Glaser describes places the parasites in somewhat abnormal surroundings.

Several reasons suggest themselves as to why the larvæ select the gullet in which to pass certain stages of their existence. The mucosa is only slightly vascular, and the reaction on the part of the animal against the parasites is inconsiderable. In other organs or tissues one frequently sees examples of encysted parasites, but I have not yet found an encysted warble larva in the gullet. One reason for this may be that the larvæ are constantly moving, and this fact may also account for their ability to pass through other tissues in their final journey to the back. It is noteworthy that nearly all helminths select either the abdominal cavity and respiratory tract or the skin for their habitat; for instance, *Gongylonema scutatum* is found in the walls of the gullet, strongyles in the lungs, bots in the stomach, &c. Possibly the presence of a freer supply of oxygen than could be obtained in the deep tissues may lead them to select these situations, though the food supply may also be an important factor in their choice.

The final position taken by the larvæ is in fibrous tissue, of somewhat the same nature as that found in the mucosa. The reaction of the body against them is manifested by œdematous swellings. Very probably this reaction would end in their destruction, since they have now taken up a fixed position. But shortly after reaching the back they bore through the skin, and bacteria gain entrance to the cavity in which they lie. Hence, it is my idea that they are helped rather than hindered in maintaining their position. In other words, the tissues have now two foes to cope with instead of one. In summing up, I think the reader will agree that the above experiment lends support to the theory of the larva penetrating the unbroken skin and thus gaining entrance to the body. This theory awaits final proof, and I am recording these observations merely for the purpose of adding my quota to the evidence already gathered.

The next point of interest concerns the position taken by the larva under the hide. While studying the structure of warbles I have noticed that the opening through the hide is oblique, and that the larva lies with its ventral surface upwards. The caudal

end is bent and protrudes through the opening, and this gives one the impression, from an outside view, that it is placed perpendicularly beneath the hide, instead of horizontally as is actually the case. Probably this has already been noticed by other observers, but the point I wish to make is that in the horizontal position the effect of the skin movements is reduced to a minimum.

THE TIME TAKEN FOR THE EMERGENCE OF HYPODERMA LINEATUM FROM THE PUPA.

Four larvæ found in stable on March 20, 1913, all emerged under sixteen days.

Three larvæ squeezed out on March 21, 1913, all emerged under fourteen days.

Five larvæ squeezed out on March 21, 1913, all emerged under nineteen days.

One larva found in stable on day of emergence, March 22, 1913, hatched in thirteen days.

These larvæ were kept in an incubator with intermittent heat up to 32° C. This shows how the temperature will influence the early or late appearance of warble-flies in the spring. A large number of larvæ were secured during the spring of 1913; nearly all were of *H. lineatum*; *H. bovis* only appeared later on. It was thought that during the spring of 1914 *H. lineatum* would be plentiful, but the contrary has proved to be the case; most of the larvæ secured so far are of *H. bovis*. Possibly the season may be responsible for this, as the early spring of 1913 was very wet. No specimens of *H. lineatum* were captured out of doors, but *H. bovis* was caught at a later date.—*From Report of Director-General for Canada.*

PITFALLS.

BY L. A. MERILLAT.

A PITFALL is a pit covered over. Those who unconsciously tread over it fall into its depths unexpectedly. Literal pitfalls are shallow or deep. If deep the victim meets with disaster, if shallow the bystanders have a good laugh at his discomfiture. The figurative pitfalls met in a surgical practice are not unlike the literal ones. They are big and small, deep and shallow, ever in our path ready to trap the reckless, the careless, the inexperienced, causing havoc here and annoyance there according to their magnitude. To be ever on the look-out for pitfalls is no insignificant attribute in any walk of life; in surgery it is an essential quality, for the pitfalls are numerous, and often they are deep and dangerous.

The purpose of these paragraphs is to enumerate the circumstances and combinations of circumstances which constitute the most common pitfalls in veterinary practice, and especially veterinary surgery.

Pitfall No. 1.—A veterinarian is called to an establishment to examine a lame horse. Being an experienced practitioner and an able diagnostician of equine claudications, he makes a very systematic examination. He notices the horse knuckles on one hind leg as he backs from the stall. On walking off only the toe of the affected leg touches the floor. Trotted, the anterior stride is short, and there is a characteristic flip of the foot as it is lifted from the ground. After trotting about the lameness improves. He flexes the hock acutely for a minute, and finds that on trotting off again the lameness is more pronounced. Inspection and palpation of the hock reveal a slight enlargement at the antero-internal aspect. He learns that the animal has been showing signs of lameness in the morning for several weeks, improving with exercise and becoming lame again after rest. He diagnoses spavin and recommends firing. The diagnosis is right and the treatment is standard. The owner, however, is not inclined to submit his horse to such radical treatment—treatment that will blemish and that may not cure the lameness—and consequently withdraws his consent momentarily to await developments. About two weeks later the patient is still lame, and on one particular morning is found pretty well disabled. He walks

on the tip of the toe, holds the lower joints rigid, and does not improve with work. Believing the horse to be getting worse from the spavin it is taken forthwith to the doctor to be fired. "He's getting worse, doc. I guess you'd better fire him," says the owner on turning over the horse to the attendant at the hospital door. The doctor, otherwise engaged, directs the patient to a stall to await his convenience. The attendant is directed to clip the hock preparatory to the firing when there is found time to do the job. Later in the day, without any further examination, the hock is fired and the patient turned over to the owner with directions for its care. Six days later (the horse still very lame) pus is found discharging from the heel, and on search for the cause a nail is found still impinged in the lateral lacuna of the frog.

This pitfall is not a warning to examine the foot of lame horses, as every experienced veterinarian does that, but it is a warning to surgeons to re-examine patients just before operating. Various accidents can befall patients between the time of examination and the time of operating, even though only a few hours have elapsed. If several days intervene, it is a very serious sin of omission to neglect the careful pre-operative physical examination of surgical patients.

Pitfall No. 2.—A large, well-fed, well-groomed and regularly worked draft horse in splendid condition of flesh is brought to the hospital affected with a sore back—a harness bruise. It is found hot, painful, oedematous, and with radiating lines extending down over the upper part of the ribs. The horse is affected with a subcutaneous abscess which might, as every veterinarian knows, attack the supraspinous ligament, and prove troublesome or even develop into a fistula of the withers. Being a good horse and in the hands of a sympathetic attendant, absolute rest and hot fomentations for four days are recommended pending the development of the abscess. At that time the patient is to return for the lancing. Having been annoyed for four days with the attempts to bathe the painful back, the horse so viciously opposes any handling of the affected region that it is thought advisable to secure him on the operating table. He fights the twitch, the belts, the hopples, and when turned down struggles incessantly while the abscess is washed, shaved, and evacuated. The whole body is bathed in perspiration and the breathing accelerated. On

being returned to the standing position the gluteals are found to be hard, the hind legs collapsing, and the whole body trembling. He is affected with an acute attack of azoturia.

This accident, which occurs very frequently, is one of the greatest misfortunes that can befall a veterinarian. The explanation that the horse did not die from the operation is never accepted very gracefully, because the restraint was a part of the procedure, and the whole management (including the four days of rest recommended) was in the hands of the practitioner. Azoturia from surgical operations is excusable when horses a few days idle are brought some distance right to the operating table and then unfortunately develop the disease while they are under restraint. The surgeon under these circumstances may have no reason to suspect the patient is susceptible, but when the patient has been under treatment before the day of operating and no steps were taken to avert this accident the responsibility is ours. In operating upon horses in good condition—the kind that are susceptible to azoturia—it is always well to act carefully, to warn, to postpone, and to prepare against this unfortunate event.

Pitfall No. 3. Casting an Aged Horse.—Almost everyone knows about the dangers attending the casting of old horses for more or less painful and prolonged operations. Sometimes we are drawn into this trap almost unconsciously. A horse fifteen or sixteen years old is about to be fired for a spavin, ringbone, strained tendon, or some other condition. In clipping the field it is found the patient is ticklish, and is already putting up an opposition to the threatened interference with its comfort. After the field has been clipped and the twitch and the sideline have been safely and firmly adjusted and placed in proper hands, it is found that every touch of the iron is suddenly met with an acute wince, and when attempt is made to glide the heated instrument over the field the patient lunges about, in spite of every effort to control it. When the patient becomes heated into a profuse perspiration, fighting vigorously the restraint, as well as the firing, it is decided to complete the operation in the recumbent position. The very much excited patient now is cast and tied, probably with a hurriedly improvised apparatus. When the limb has been positioned and the firing resumed the patient continues to struggle, wiggle, strain, and fight incessantly. Sud-

denly a dull thud is heard; it is thought from the character of the sound that a tie rope has broken. The struggles are now less violent and confined to the fore part of the body; the hind extremities are limp. The knowing surgeon is now aware that the sound was something more than the breaking of a rope. The lumbar vertebræ have fractured.

This pitfall, while fortunately not so very common, does occur at least once in the lifetime of almost every veterinary surgeon. The victim is usually the young practitioner who has neglected to recognize the potential hazard that lies in the backbone of an aged spavined horse that is vigorous enough to put up a formidable fight against restraint.

Pitfall No. 4. Casting with a Young Rickety Colt.—A colt apparently in fair health, but affected with an invisible unmineralized condition of the skeleton, is cast for castration. The tying is not well done; the hind legs are too loose and push forward towards the elbows. Instead of stopping to rearrange the half-tied members the operator proceeds with the operation, thinking the tie is good enough for such a harmless creature. During the painful part of the procedure the hind legs are braced against the ropes, the back is roached, and in this curled-up position a severe struggling tenesmus ends with a dull breaking sound. When the operation is over and the patient has been with difficulty raised to the standing position a femur or tibia is found to be fractured. Often it is the separation of the diaphysis from one of the epiphyses of either of these long bones, at other times it is the fracture of the shaft. Either is serious, fatal. The prevention here is found in tying all patients well—tying them so that the legs are folded into a helpless flexion, instead of ever attempting even the simplest operation upon a half-secured subject.

Pitfall No. 5.—Without an assistant to protect the head against injury a horse is placed upon an operating table. The head is simply fixed to the table with the rope of a five-ring halter. The surgeon and his assistant are occupied with some other part of the body; the head is thought to be safely secured against injury. During the long-drawn-out preparation and performance of the operation, the body from the struggles is pushed forward tightly into the halter, the rings of which press hard and long against the temples. When the patient arises the upper lip is crooked,

drawn to one side, and the under lip is dangling at one corner, exposing the buccal mucous membrane. *The patient has facial paralysis.* The rings of the halter have bruised and probably permanently damaged one of the facial nerve trunks that surround the inferior maxilla just below the temporo-maxillary articulation. This accident occurs in every degree of severity, from a transient paralysis lasting only a few hours (sleeping nerve) to a grave permanent impediment of the whole side of the face.

The prevention is found in the use of a round, soft rope halter placed always over, and never under, the padded hood-wink. Furthermore, the head of a horse secured on an operating-table should not be fixed with a rope. It should be held with a rope run through a slot in the table by an assistant who will "give and take" as the head moves about.

Pitfall No. 6.—An undersized horse or a colt is secured on an operating-table of standard size without making any changes in the belts and hopples. When turned down the feet barely reach to the hopples; the legs are stretched because the distance between the body-belts and the feet is too long for a horse of that size. On returning the subject to the upright position the fore-leg that was undermost collapses under the weight of the body; it cannot support weight. *The diagnosis is brachial paralysis.* One or more of the radicals of the brachial plexus were injured by stretching, as the weight of the body while struggling pulled heavily against the fixed foot. There are likewise different degrees of brachial paralysis. In long-drawn-out operations the leg may "fall asleep" from prolonged pressure of the plexus in horses of any size, but if there is no nervous injury the infirmity shown on arising is transient, passing off in a few minutes, or at least in half an hour. When this accident occurs in small horses and shows no sign of improving after some hours there is reason to be alarmed, because here some nerve has been more or less permanently injured. In some cases recovery occurs only after several weeks, and rare cases atrophy, and never entirely recover the full use of the leg.

Legs of small horses secured on the operating-table should never be fixed firmly at the feet. It is better to give the feet considerable freedom of movement at the hopple, so that lunges of the body do not stretch the legs. Furthermore, a second set

of hopple holes, placed closer to the belts, should be provided for small animals. These will be found useful in securing small horses, jacks, small mules, colts, and cows whose legs are too short for the appurtenances of the standard tables.

Pitfall No. 7. Overdosing with Cocaine.—It is decided to perform a bilateral plantar neurotomy in the standing position. Cocaine solution is selected as the local anaesthetic. A liberal amount of a 10 per cent. solution is injected subcutaneously over the four proposed seats of resection. The first and probably the first two nerves are resected, and the wounds sutured without untoward event, but when the third incision is made there is some opposition; the leg is jerked away from the assistant, probably two or three times in succession. The patient is sweating about the shoulders, the eyes are staring, the body trembling slightly, and the general appearance of the patient is that of nervousness. It will strike when the leg is picked up, it will shake the head against the torture of the twitch, and, in short, is fast being transformed from a once tractable subject to a veritable fighting fiend. Further attempt to complete the operation in the standing position is futile. The patient is poisoned with cocaine, and the drug is exerting an effect directly opposite to that for which it was given. It is producing hyperesthesia instead of anaesthesia.

The remedy is more careful dosing with this poisonous drug. Four per cent. solution is strong enough if injected at the right place and delivered *en masse* instead of spreading it around over a large area. Furthermore, when four nerves must be resected, it is best to cocainize each seat just before the incision is made. The effect of properly delivered cocaine is almost instantaneous, and then by cutting down upon it immediately much less of the solution is absorbed.

Pitfall No. 8. Cutaneous Gangrene after firing Ringbones.—A horse affected with ringbone lameness, for want of a better treatment, is fired either with a pointed or edged iron. The hairy pastern is clipped, fired, and then blistered. Four days later there is more lameness, and the coronary region is swollen and very painful, and the patient is sick. Day after day the lameness is accentuated as the leg swells higher up. On the eighth or ninth day irregular patches of skin, some large and some small, are found to be dead, and crevices (lines of demar-

cation) are appearing around them, and pus is coming from every direction. Soon the patches slough off, and if the patient escape synovial complications and death from decubitus, the large granulating surfaces cicatrize very slowly into very unsightly horny scars. The patient either dies or is left permanently blemished after a long annoying convalescence.

The pasterns of horses are susceptible to necrobacillosis, and firing like any traumatism may become its exciting cause. Firing higher up never behaves in this manner. It is very evident, therefore, that firing of the pasterns should be preceded with a disinfection of the skin much the same as if a cutting operation is to be performed. In cities where necrobacillosis seems to be most prevalent in horse feet, firing of the pastern should be done only after the part has been washed copiously with soap and water, and then rinsed off with a strong solution of mercuric chloride. This done, sloughing will always be avoided. Severe firing (broiling the skin) may cause sloughing, but the sloughing therefrom is of a different order than that from necrobacillosis.—*American Journ. of Vet. Med.*

PREMIUM LIST OF GLASGOW STALLION SHOW.

THE premium list of the Glasgow Agricultural Society Stallion Show, which takes place at Scotstoun Show Ground on Wednesday and Thursday, March 1 and 2 next, has been issued. Premiums of £100 (terms £5 and £5) and £80 (terms £2 and £3) are offered for horses three years and upwards and two years respectively, to travel Glasgow district during 1917 season. The prize money in the two-year-old and yearling classes has this year been increased to the extent of £20. The selection of premium horses takes place on Wednesday, March 1, at 12 noon, and judging of open classes on Thursday, March 2, at 9.30 a.m. The following judges have agreed to act:—

Premium Classes.—Mr. William Brown, Craigton, Bishopton; Mr. Alex. Buchanan, Garscadden Mains, Bearsden; Mr. Alexander Murdoch, East Hallside, Newton.

Open Classes.—Mr. Charles Aitkenhead, Carr House, New Seaham; Mr. John Holmes, Glenshinnoch, Bishopton; Mr. John Wilson, Yett, Liberton, Carnwath.

Clinical Article.

SOME EXPERIENCES WITH MALLEIN IN CASES OF NASAL DISCHARGE.

By M.R.C.V.S. (TRANSPORT).

THE subjects were remounts purchased by the British Army in U.S.A., examined previous to purchase and declared free from contagious or infectious disease. They were railed down to the shipping wharves in cattle trucks, and many of them were sweating profusely and showing symptoms of catarrh on arrival. After drinking at a cold water trough they were put on boardship at the rate of about 200 an hour. They all drank at the same trough and catarrh and pink-eye developed amongst them. I tested numerous horses with the mallein test, which had persistent nasal discharge with uncharacteristic lesions of the upper air-passages. None, however, reacted; but after a few days a visible diminution was noticed in the catarrhal flow and soon afterwards its complete disappearance followed. This did not arise from a simple coincidence of favourable circumstances, for in all cases, even the most obstinate ones which had withstood the usual remedial measures, the same favourable result took place. In doubtful cases I gave a second injection, timed as near as possible to within three days of the approximate date of landing, which was followed always by apparently complete recovery and cessation of nasal discharge entirely up to the time of landing, after which I lost sight of them.

Remarks.—From results it appears that mallein is effective against a non-specific nasal discharge. The mallein was injected subcutaneously and was obtained from the Royal Veterinary College. The ophthalmic mallein test was not used because cases of pink-eye were prevalent and it was considered that in many instances the ophthalmic test would not have been reliable. My remarks apply to horses and not mules. The vagaries of the reagent on the latter, judging from the report of such an experienced and well-known man as Mr. Scott, F.R.C.V.S., Bridgwater, are, to say the least, somewhat embarrassing and disconcerting, and a source of anxiety to veterinary surgeons engaged on transport work. American practitioners and those in charge of mules in the Army ought to have experience of mallein as it concerns the mule.

THE PRESENCE OF *DEMODEX FOLLICULORUM* IN THE HORSE.

By R. G. LINTON, M.R.C.V.S.

Professor of Hygiene, Royal (Dick) Veterinary College, Edinburgh.

PARASITIC skin diseases of the horse are ever a source of annoyance, but when they appear among Army horses during a war, the state of annoyance quickly changes to one of serious gravity, causing, as they do, an immense amount of labour, with loss of public money and, we may imagine, military efficiency.

It is not surprising, therefore, that strict measures are adopted for the early diagnosing of mange, its isolation, and rigorous treatment; it is, however, curious to note that so little advance has been made in either our knowledge of equine skin diseases or of their treatment.

The presence of the *Demodex folliculorum* has been seldom observed, or if observed, seldom noted, in the horse. Neumann [1] states that the *Demodex folliculorum*, var. *equi*, has been found by E. Wilson in the Meibomian glands of the horse, and that in 1845 Gros found it in the horse's muzzle. Noël-Pillars [2] mentions that it has been found in the Meibomian glands of the horse, and that there it is of very little clinical importance. Niclous [3] states that "varieties of the *Demodex folliculorum* are found in the glands of Meibomius and in other anatomical parts of the eyelids alone, or when other regions of the surface of the skin in the horse, ox, sheep, goat, pig, rabbit, marmot, dog, cat, or other species are also affected."

During the course of examination of some hundreds of mange scrapings and of horses "clinically" affected with mange, the writer has found the *Demodex folliculorum*, var. *equi*, on seven occasions located where, so far as he is aware, they have not previously been recorded, namely, on the withers and anterior part of the back. In each instance the demodex was found when the scrapings were personally made during a systematic search for elusive sarcoptes; it has not been found in scrapings sent in for diagnosis, these, as a rule, being too superficial to contain the parasite. In no case was the demodex found by itself; it was in each case associated with the sarcopt. The number of parasites found was few, being two or three after extensive scraping, eight

being the largest number found on one horse during the search for the usual parasite.

It is not suggested that the *Demodex folliculorum* is only present in company with another parasite; the modern method of diagnosing parasitic skin diseases, and the only reliable one, that of boiling suspected material in liquor potassi and centrifuging, which was placed before the profession by Sheather, [4] will probably reveal on careful searching that the habitat of *Demodex folliculorum* is more widespread than is usually thought, and its occurrence probably frequent.

It is for the veterinary parasitologist to show if its presence is of any clinical importance.

REFERENCES.

- [1] NEUMANN-MACQUEEN : "Parasites and Parasitic Diseases of the Domesticated Animals," p. 193.
- [2] NOËL-PILLARS : "A System of Veterinary Medicine." E. Wallis Hoare, vol. ii, p. 1452.
- [3] NICOLUS : *Ophthalmology*, p. 454. (In the Press: proof lent through the courtesy of the translator, Mr. Henry Gray, M.R.C.V.S.)
- [4] SHEATHER : *Journal of Comparative Pathology*, vol. xxviii, part i, p. 64.

Translation.

ON THE SYMPTOMS OF ULCER OF THE ABOMASUM IN CATTLE.

BY DR. A. SALVISBERG.

Tavannes.

THE diagnosis of ulcer of the abomasum in ruminants is not easy. The reason for this is on account of the extremely variable symptoms shown. No symptoms of illness and sudden death alternate with severe disease which necessitates slaughter, and again, a protracted illness may occur which continues for weeks and months. Such varying symptoms in a malady make recognition of the complaint difficult.

I am describing here four typical cases of *ulcus ventriculi*, which are of interest clinically, and in which the symptoms diverge very much.

Case 1.—On August 14, 1912, I was called to make a *post-mortem* on a cow one and a half years old which had been found dead on hill pasture, and was believed to have died of anthrax. The *post-mortem* showed none of the typical symptoms of anthrax, but there was exudative peritonitis and a perforation of the abomasum wall. I thought this perforation might be due to a trauma, having had many such cases where horses and cattle have been pastured together, as also rupture of the small and large intestines and spleen (all arising from horning or kicking). Always the mark of the blow from a horn or a kick could be detected. This was not so here, however. The abomasum was perforated at three places. They were little circular holes, as if made with a pointed iron. The mucosa of the abomasum was oedematous, and there were quite a large number of large and small ulcers covering its inner surface. The animal at the time of examination was in good condition, but some time previously, according to the owner, had suffered from coccidian diarrhoea, which may have been the cause of the ulcers. For the rest the animal had never been ill.

Case 2.—On November 30, 1913, I was called to a three and a half year old Simmentaler cow which had been suffering from diarrhoea for a few days. Appetite and rumination were in

abeyance. There was much general disturbance of health, temperature, pulse, and respirations all being increased, venous pulse, profuse diarrhœa. I told the owner it was enteritis, and entered in my journal "enteritis or ulcer of the abomasum." Several graduates state that hydrochloric acid is a certain diagnostic in *ulcus ventriculi*, and Hutyra and Marek, vol. ii, p. 332, state that a like reaction is produced in the case of an abscess due to a foreign body. This cow was given hydrochloric acid and tincture of opium. The reaction was typical. On the œdematos mucosa of the abomasum there were a large number of ulcers, deep, wide, and extensive, and quite distinct in form.

Case 3.—A heifer had suffered several weeks from diarrhœa. She was greatly emaciated and was slaughtered. *Post-mortem* showed slight œdematos state in the abomasum with enlargement of the *plicæ spirales*. There were true abomasal ulcers present. No worm nodules nor large erosions.

Case 4.—A ten-year-old pregnant cow had been well fed, kept getting thinner, but was not greatly emaciated. The administration of hydrochloric acid gave as prompt an effect as in the second case.

Summing up:—

Case 1.—A cow in very good condition, perforating *ulcus ventriculi*, peritonitis, death.

Case 2.—Well-nourished animal, sudden severe illness. Slaughter necessitated.

Case 3.—Advancing emaciation with continuous diarrhœa, very good appetite and ruminating.

Case 4.—Advancing emaciation for weeks, normal bodily functions, then sudden severe illness necessitating slaughter.

From many cases of *ulcus ventriculi* observed and noted by me, the most frequent train of symptoms met with correspond to those mentioned under heading III.—*Swiss Journal of Veterinary Medicine.*

G. M.

War Note.

CARE OF HORSES ON BOARD SHIP.

STRICT attention to the following brief instructions is essential to success in care of horses on board ship:—

(1) *Rejection*.—Only healthy horses to be shipped. Rejection of any horse having a temperature over 102° or any other evidence of contagious disease is necessary.

(2) *Cleanliness*.—Mucking out must begin at once, and be continued throughout the voyage. Filth must not be allowed to accumulate anywhere.

(3) *Disinfection*.—Of first importance, as a routine measure and with special direction to standings, halters, hay nets and all fittings contaminated with discharges from infected animals.

(4) *Discipline*.—The veterinary officer must be energetic himself; there must be unremitting attention to, and supervision of, watering, feeding, mucking out, exercising, &c. The disciplined and energetic co-operation of all concerned is essential.

(5) *Removal of Sick Horses and Mules*.—The sooner a sick animal is detected and removed to an airy upper deck the better will be the chances of recovery and the less the spread of infection. The first principle in treatment of sick horses on board ship is the application of fresh air.

(6) *Treatment of Sick*.—Do not attempt to treat hopeless cases; it is contrary to hygienic principles and leads to infection of neighbouring horses. Avoid unnecessary drugging; prevention, hygiene, and active individual attention are far more efficacious than drugs on board ship.

(7) *Ventilation*.—Enlist the co-operation of the ship's officers in utilizing to the utmost every means of ventilation provided. Wind-sails, wind-scoops and the like need constant attention.

(8) *Septic Pneumonia*.—Every case of septic pneumonia occurring on board ship will be destroyed as soon as the odour of gangrene enables a definite diagnosis to be established. The carcase will be immediately thrown overboard and the stall and fittings thoroughly disinfected.

(9) *Pens versus Stalls*.—It is strongly recommended to travel

horses loose in pens formed by removing enough side bars to form pens for from five to ten horses, according to the construction of the ship. Vicious horses should be retained in stalls. Contrary to the prevalent idea horses carried loose in pens are less liable to falls, and consequent injury, than those in stalls.

(10) *Feeding, Watering, &c.*—Water as frequently and as freely as possible. Horses are extremely liable to colic and its complications, also heart failure from dietetic causes on board ship, and oats must be given sparingly. It is better to give no oats at all for the first three days. On the fourth and fifth days give 2 lb. of oats, on the sixth day 3 lb., and thereafter increase to, but on no account exceed, 4 lb. daily. Bran, damped and salted, and hay may be given freely throughout the voyage. Feed at least three times daily.

(11) *Exercise.*—This should be carried out wherever and whenever possible. Travelling horses in pens instead of stalls compensates greatly for lack of regular exercise.

(12) *Ship Staggers.*—A disease simulating epilepsy in man. Bring the animal under an open hatchway and douche the head with cold water. Whenever an animal is seen to be distressed bring it under a hatchway.

(13) *Foothold.*—Sprinkle ashes freely on platforms in rough weather and along alleyways whenever an animal has to be moved.—*Army Veterinary Department Leaflet.*

VETERINARY HOSPITAL SUGGESTED.

MR. D. CUMMING, Culter, Aberdeenshire, the President of the North of Scotland Veterinary Society, at a meeting of the Society in Aberdeen recently, said he was convinced that until they got the same conditions as the medical profession many valuable animals would be lost, not from want of proper treatment, but because the treatment was handicapped by the surroundings of the patient. What they had to strive for was a properly equipped veterinary hospital in a central position, where they could send their patients when their conditions were such that the attending surgeon could not do justice to himself or his patient.

Correspondence.

MILK FEVER IN COWS.

To the Editor of THE VETERINARY JOURNAL.

SIR,—I have read Mr. MacCormack's article and letter with interest. If all cows got up by the clock at the fourth hour there would be much sound argument in his observations. From my own experience, however, there is no guarantee of this and I think he will find, as years go on, that it may be six, eight, ten, twelve, twenty-four hours, nay, even longer, that cows lie before rising, and the removal of the tapes too early will not accelerate the getting up. As between pot. iodide and air the matter is not one of mystery, but of policy. If mystery entered into these matters then the effect of the subcutaneous injection of "cardiacs" must appear to the layman as almost a species of black magic. It is a good point made by Mr. MacCormack as to these injections and is worth bearing in mind, but it is not a miracle. The injection of air neither benefits us nor our pal the chemist. Neither of us can live on air alone, and when the farmer comes to pay his bill he may say, "Why the deuce should I pay for air; it is a free commodity anyway?" Personally, we still think the Danish method with pot. iodide better than the German air one, and we can give our reasons if asked. We may state that with pot. iodide we have never had a bad effect either on milk flow or the udder, but as we have written we always make our solution at home before starting and thus know that the mixture is made under good conditions. We have quite lately seen the subject of our recent article and she has been giving her usual supply of $3\frac{1}{2}$ gallons a day quite regularly since.

Mr. MacCormack appears to think that complications in the ailment invariably fail if his treatment is carried out, but surely these incidents in any disease most frequently occur from matters over which we have little control and often from us being called in too late for the best and quickest results to be obtained. Milk fever cases vary in severity and complications in different years and regions. Various methods of feeding and dairy management in individual parts of these Isles cause some men to get more difficult and complicated cases than others. In 90 per cent. of instances here we cannot even get a decent loose box to put an ailing cow in. In his letter and article Mr. MacCormack was not writing as a pupil for professors and examiners but as a professional man for professional men, who quite know the importance of the right position for an ailing recumbent cow to be kept in. To have this carefully explained to them reminds me somewhat of that unprofitable operation known as "gilding the lily."

Yours truly,
G. MAYALL.

Reviews.

The Structure of the Fowl. By O. Charnock Bradley, M.D., D.Sc., M.R.C.V.S. Crown 8vo cloth, with 73 illustrations. Price 3s. 6d. net. Published by A. and C. Black, Ltd., 4, 5, and 6, Soho Square, London, W.

The veterinarian may at any time be asked to make a *post-mortem* on a dead fowl. Unless he is acquainted with the anatomy of the bird, the deductions he may make from his investigation will be liable to error. This book gives particulars of the naked-eye and microscopic anatomy of the domestic fowl. The study of the diseases of poultry will be made considerably easier after the knowledge which the author puts before his readers has been grasped. Much interesting information may be gained by a careful perusal of the work. Two out of many rays of light shed may be mentioned. Owing to the number of eggs laid in a bird's lifetime the abdomen is not large enough to accommodate eggs formed by two ovaries, consequently one ovary dwindles and disappears; there is no pelvic symphysis in poultry. If the pelvic bones were joined ventrally, their sufficient dilation for the passage of eggs would be impossible. There are thirteen chapters in the work dealing with the different organs and anatomical tissues. Perhaps the most welcome pages are those on the reproductive organs and the development of the chick.

There are many works by laymen on poultry, but the field has been consistently neglected by the veterinarian, and this is not to his credit. The Board of Agriculture is doing all it can to stimulate, what ought to be, the lucrative operation of poultry rearing. We spend about £9,000,000 a year on imported eggs. We want to give our country the benefit of some of this money. There is plenty of room for scientific books on poultry, and we heartily welcome this little volume as a commencement in filling a gap in our information which has too long been evident. As one of the manuals of the Edinburgh Medical Series, edited by Dr. John D. Comrie, the matter, printing, binding, and illustrations leave nothing to be desired.

G. M.

Annual Report of the Camel Specialist for the year 1914-1915.

Lahore. Printed by the Superintendent, Government Printing, Punjab, 1915.

The importance of the camel as a utility animal and beast of burden makes it desirable that veterinary knowledge of it should be disseminated. Mr. H. E. Cross, I.C.V.D., M.R.C.V.S., D.V.H., A.Sc., is doing important and valuable work in investigating the diseases of this quadruped. In some parts of our Dominions the camel will live where horses die like flies, consequently it is of economic and scientific weight that his care in health and disease should be understood. Mr. Cross calls atten-

tion to the prevalence of surra in the ruminant, and as a remedy seems to favour destruction and compensation in the case of diseased subjects. The author has made many interesting experiments in the medicinal treatment of camels. As purgatives, any of the following may be used: 8 oz. of kamala, four pints of linseed oil, $3\frac{1}{2}$ dr. of croton oil, $3\frac{1}{2}$ oz. of aloes, $1\frac{1}{2}$ to 2 lb. of mag. sulph., 3 oz. of gamboge, and, hypodermically, 2 grm. of eserine, and 2 gr. of pilocarpine. Camels not castrated until they are 7 years old or upwards seem to do best. The diseases most prevalent among them were surra, pneumonia, colic, pus in the frontal sinuses, a form of influenza, and mange. Only five rupees are sanctioned for the purchase of drugs for each Grantee Camel Corps, and Mr. Cross calls attention to the inadequacy of this sum. There is also a lack of sheds to carry out investigation as to the susceptibility of camels to various infectious diseases, such as rinderpest, anthrax, and haemorrhagic septicaemia. The work done by the camel specialist during the year is a tribute to his energy and acumen. He travelled 10,196 miles by rail and 1,637 miles by road, and carried out very many experiments and investigations of a praiseworthy description. Mr. H. E. Cross may be congratulated on original work in a unique field.

Tropical Veterinary Bulletin. Issued under the direction of the Honorary Managing Committee of the Tropical Diseases Bureau, Imperial Institute, S.W. Sold by Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden, W.C. Editor, A. L. Sheather, B.Sc., M.R.C.V.S. Price 3s. net.

The usual handy references to a wide variety of tropical diseases compose the fourth number of vol. iii of the *Tropical Veterinary Bulletin*. The periodical keeps well up to date in regard to the literature perused and commented on. Trypanosomiasis, leishmaniasis, protozoa, helminths, biting flies, rabies, and reports from veterinary officers of our Colonies furnish subject matter for annotation. Major Hobday's work on "Anæsthesia and Narcosis of Animals and Birds" is reviewed by Professor Macqueen. To students of tropical medicine the *Bulletin* must be invaluable. Some interesting points come out in the lines on "Some Observations on the Theory and Practice of Dipping," by W. F. Cooper and H. E. Laws. In the case of dipping with arsenic the drug gains access to the tissues of the tick by being imbibed not absorbed. The conclusion is also come to from the evidence that it is imbibed from the skin and not the blood, but in repeated dipping an animal accumulates arsenic in its skin up to a certain maximum, and the excess is absorbed by the blood-vessels and subsequently excreted. About 30 grm. of arsenic, or a full toxic dose orally, remain on the skin after one dipping.

ARMY VETERINARY SERVICE.

TEMPORARY CAPTAIN J. W. F. BRITTLEBANK to be temporary Major. To be temporary Lieutenants: A. J. S. Reynolds, P. Haugh.

Captains to be temporary Majors: W. J. Dale, W. H. Simpson. Temporary Lieutenant P. J. Austin to be temporary Captain. To be temporary Lieutenants: H. Quiggin, W. S. Walker.

The appointment of the following temporary Captains is antedated as follows: T. W. J. Gardiner to October 7, 1914; R. W. Simpson to October 13, 1914. The Christian names of temporary Lieutenant Alfred Edmund Davies Froggatt are as now described and not as stated in *Gazette* of January 5.

Temporary Lieutenant E. K. Henton to be temporary Captain. R. J. Bushnell to be temporary Lieutenant.

G. T. E. Anderson to be Lieutenant. H. W. Dawes to be Lieutenant.

L. G. Gryspeerdt to be temporary Lieutenant. F. T. Smyth to be temporary Lieutenant.

Temporary Lieutenant H. E. Whitmore to be temporary Captain. C. W. Finnemore to be temporary Lieutenant (substituted for notification in *Gazette* of June 17). To be temporary Lieutenants: D. M. Ireland, G. S. Walker, B. Philp.

Captain F. J. Taylor to temporary Major. T. M. C. Hunt to be Lieutenant. J. A. McLaughlan to be Lieutenant.

Temporary Lieutenants to be temporary Captains: B. H. Mellon, J. H. B. Martin, A. Whicher, J. MacBride, A. R. B. Richmond, H. B. Collet, G. G. Howard. To be temporary Lieutenants: A. D. Morgan, J. McC. Barry, W. J. Moran, W. A. Smith.

N. A. McG. MacEwan to be Lieutenant.

Temporary Lieutenant W. J. S. Foley relinquishes his commission.

Temporary Lieutenant W. W. Hindle to be temporary Captain. J. Connor to be temporary Lieutenant.

Lieutenant J. Crooks resigns commission. W. W. Scales to be Lieutenant.

To be temporary Lieutenants: J. D. Whitehead, F.R.C.V.S., C. B. Sheinmonds, J. G. Taylor, W. C. H. Steele, S. J. Motton, F.R.C.V.S., W. Hill, J. B. Mackie.

Lieutenant (on probation) M. Glynn is confirmed in his rank. J. A. MacLaughlan to be Lieutenant.

Captain C. A. Murray to be temporary Major whilst holding appointment of Commandant, School of Farriery.

To be temporary Lieutenants: H. J. Hughes, J. Bradley, H. A. King.

Temporary Lieutenants to be temporary Captains: J. M. Jamieson, G. K. Hobson, F. V. Perry.

Major J. J. Aitken to be temporary Lieutenant-Colonel. To be temporary Lieutenants: A. W. Campbell, S. T. Jackson, B. Wittam.

THE
VETERINARY JOURNAL

MARCH, 1916.

Editorial.

OUR POSITION.

THE welfare of the whole body of our profession is intimately bound up with the standing of our governing, advising, and creating Council. It is to the interest of all of us that it should be strong, wise, able, and alert. If it is weak, vacillating, or lacking in foresight, our position will suffer, we shall lose weight in professional circles, we shall see others take from us what is ours by right and by reason. If it is forceful, wideawake, progressive, and discerning, we shall not only hold our own as a profession, but advance with the times. The lesson of the French proverb, "Aide-toi et le ciel t'aidera," needs taking to heart by us at present. Whatever may have been the opinion of some of us in days gone by when funds were more plentiful than they are now, and a few wondered why they were not used more liberally, yet to-day all reasoning men must see that the position is critical, and the majority of us surely would deeply deplore any cause bringing about a serious hindrance of necessary activity or the cessation of the only efforts which make our inheritance of the privileges of a corporate body existent, valuable, and worth while.

The matter of a sound financial status of the Royal College of Veterinary Surgeons is not a private one. It is a thing of paramount importance that concerns every member of the veterinary electorate. For this reason we think the electorate should be appealed to in the present crisis. In a body which depends for its position and prestige on the amount of its technical knowledge and learning, on its sound education in the science and art of veterinary medicine and surgery, it is deplorable that serious economies in connection with education should be suggested, even if only for a time. It would be invidious and harmful for a man to be referred to in after years as a graduate or student of 1916 or 1917 when veterinary science progressed backwards. "Economical" examinations are generally of poor

calibre, and by cutting down expenses in these directions there is a chance of spoiling the ship for the present and future for the sake of a few figurative ha'porths of tar. At any rate, retrogression is not justified until the whole of the profession has made its voice plain in the matter.

We do not believe that Councilmen are so friendless professionally as their actions and views at times would seem to suggest. We are certain that with many of us an appeal to our pockets will not be taken as an unpardonable insult, and if it comes to "those who can do may do," we fancy there will be a considerable majority in favour of the "cans." If we do not always see eye to eye with some of the decisions and opinions of the members of our senate, yet we appreciate and value much of their work, and can understand the chaos and irreparable loss that would arise without them and their activities. We can believe the statement made to us some time ago by a well-known and respected Councilman that few of the general body of the profession know how much good sound work the Council does. Much of it, by reason of being done in committee, never sees the light of publication, but it is by no means slight or unimportant.

Full play in all the fields of activity in which the Council figures, and should figure, and we should like it to take a fuller part in even wider fields than it now concerns itself with, necessitates a full purse. The sinews of work, no less than those of war, require ample funds. It is a matter of regret, therefore, that the income of the Royal College of Veterinary Surgeons has declined regularly in recent years. In 1909-1910 the annual receipts were £2,861 7s. 11d.; in 1910-1911, £2,719 4s. 10d.; in 1912-1913, £2,330 10s. 8d.; in 1914-1915, £2,320 7s. 6d. There is reason to fear that under present conditions a further drop will be noted. Existing methods are not adequate to keep us afloat and buoyant, and an appeal to the crew to help the vessel to cruise fearlessly and successfully should be made.

We would like to see many things which intimately concern the rights and privileges of members of our profession more securely guarded and safely protected. It is little use being in a profession if we are no better off than an ordinary member of the public. In many cases we are not so well protected from harm as the members of a tradesman's union, and in not a few cases the conduct of one veterinary surgeon to another is such

as a member of a trade union would not be guilty of. These things want altering by better discipline and sterner measures, as well as by a higher general sense of duty and conduct. Dirty actions ought to be penalized and effectively dealt with by a disciplinary body of our own members. Reprisals, which some advocate, only recoil morally on those who practise them, and render them as blameworthy as the original offenders, and as unentitled to support. The very important operation of keeping the poacher and quack out of our domain requires a plentiful supply of money. A full purse might enable us to take up a stronger position in animal-producing affairs, to have more influence in securing proper representation of our body in matters dealing with animals, to check slights put upon us, and to grasp situations which by all laws, human and divine, we are entitled to. Then the general intellect and culture of our circle might be improved by a well-equipped library, our practice be bettered by a few clinical hospitals under our own control, and our proper place be taken in questions affecting research into animals diseases. Such institutions as "Our Dumb Friends' League" would be under expert supervision if they existed, and we would add that some parsons (as Dean Welldon recently suggested) might be taught that human souls, children, and babies are more suitable objects for their care and consideration than horses, dogs, and cats. In many ways ample funds wisely used would mean brighter and better days for all of us. Now is the time to call all hands to the pump and stop the leak, so that we may plough our way to a productive land and take on board a fair and valuable cargo.

We could mention many more progressive matters that a strong Council might concern itself effectively with, but they all depend primarily on a full purse. We cannot both have our cake and eat it. There is a saving vein of generosity in our profession, and we feel sure that this particular disposition has only to be appealed to and touched for it to respond gallantly and in full measure. A successful appeal might achieve a twofold result by putting the Royal College of Veterinary Surgeons on a sound financial footing and helping on the War.

G. M.

MILK FEVER.

THE subject of milk fever is of perennial interest to the veterinary surgeon. Our pages have recently been occupied by articles and discussions on the matter. We are publishing this month an important contribution on "Parturient Paresis," by Dr. Alfred Guillebeau, of Bern, a Swiss veterinary surgeon. The literature on milk fever is copious, but far more attention has been directed towards the symptomatology and treatment than the pathology of the disease. Many cows have been treated in the past, and large numbers have succumbed to the complaint, but comparatively little *post-mortem* research has been conducted on carcases by skilled men. The vagaries of the udder, its vessels, and tissues have been almost entirely overlooked in this connection. Success in treatment has preceded a rational explanation as to why the therapy is so effective. Dr. Guillebeau supplies a reasoned theory as to the cause of the complaint, and one which has much to commend it.

Anaphylactic symptoms in general in the irritable stage are characterized by unrest, convulsions, copious dunging, exophthalmos, and blindness; these occur also in the first stages of parturient paresis. Similarly, in the paralytic stage in both affections we observe a comatose condition, muscular paralysis, refusal of food, weak pulse, superficial breathing, dung and urine retained, no fever, often subnormal temperature, and occasionally oedema of the skin.

The disease here is almost universally known as milk fever. It is a name like many others that we use that has no foundation in fact. The French call the malady puerperal coma or vitular fever. The Swiss call it *parturient parcsis*, and this name, we think, is the best one up to the present to describe the ailment. Since Schmidt brought forward his treatment in 1897 the lives of many thousands of cows must have been saved, and it is gratifying to note that in one country, at any rate, a scientific attempt has been made to solve the riddle of the causation of the disease. Perchance, veterinary research may once more aid human medicine and in this case help investigation as to the cause of parturient eclampsia in woman.

G. M.

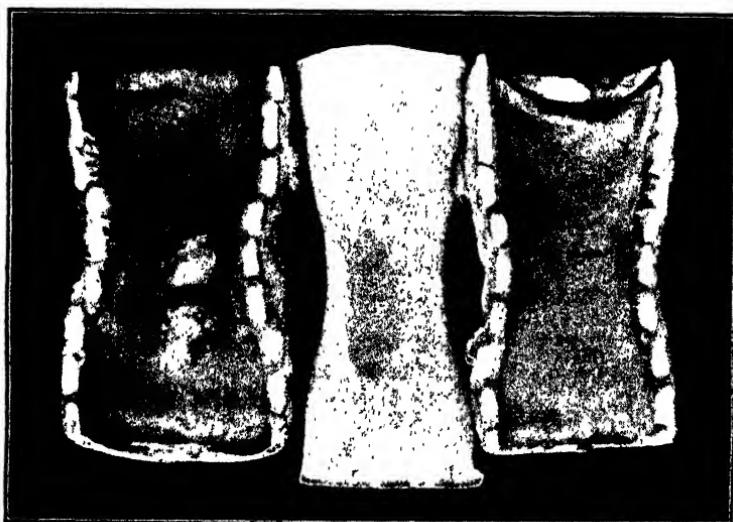
Some Interesting Pathological Specimens.

SEQUEL TO TRACHEOTOMY.

BY MAJOR R. C. COCHRANE, F.R.C.V.S., A.V.C.

THREE interesting pathological specimens came under my observation lately, with the following history:—

Three horses were destroyed owing to the great distress in breathing, which was well marked on the slightest exertion. The tracheas were sent to me for examination. It was evident from their appearance that tracheotomy had been performed. There was considerable constriction with occlusion of the trachea, together with great thickening of the walls.

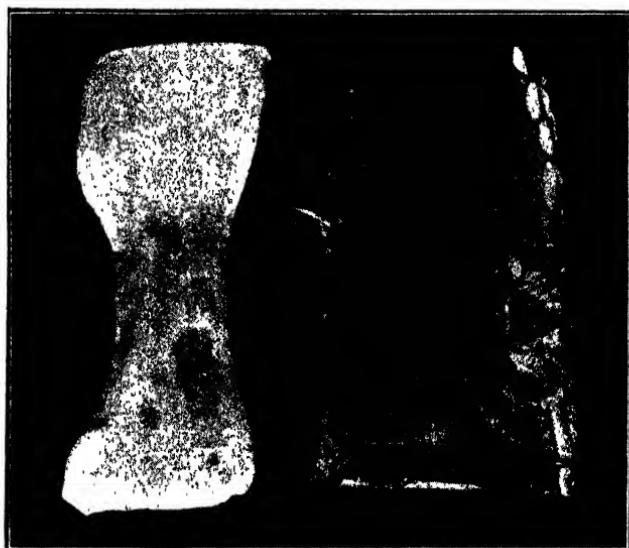


A, longitudinal section of trachea showing occlusion; *B*, wax model of lumen of trachea.

Lately I have seen another such case during life. It would be interesting to ascertain what proportion of horses that have had tracheotomy performed develop this condition, and whether cutting through a ring of the trachea and putting in too big a tube is responsible for it.

I enclose photographs of the tracheas and also of the models made of the tracheal constriction.

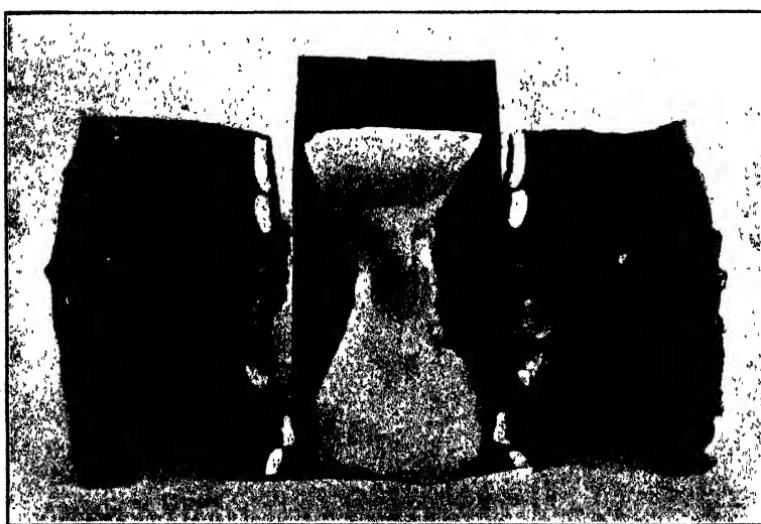
I am indebted to Staff-Sergeant Kiddell, A.V.C., for the photographs.



B

A

A, longitudinal section of trachea showing occlusion and thickening of wall;
B, wax model of lumen of trachea.



A

B

A

A, longitudinal section of trachea showing occlusion; *B*, wax model of lumen of trachea.

Clinical Cases.

THREE CASES OF RUPTURE OF THE DIAPHRAGM IN THE DOG.

By HAROLD STAINTON, M.R.C.V.S.
Kensington, W.

INSTANCES of rupture of the diaphragm in the horse have been reported many times in the veterinary press, but in the dog the lesion is not common, and on this account, if for no other reason, the following cases are of interest, particularly as they each had a different origin:—

The first case noted was from injuries self-inflicted. The second from injuries as a result of external violence. The third was undoubtedly congenital.

Case 1.—A Pomeranian, 14 months old, was brought to hospital with following history: The dog was accustomed to jumping into the air at instigation of the owner, and on the previous day had cannoned against the leg of a bedstead while performing this trick. The animal cried out, and proceeded to chew his lead and show other signs of pain. This occurred at 6 p.m. Later the dog settled down, but appeared dull, and a dose of castor oil was given. Next evening he refused food and commenced to vomit, upon which he was brought to hospital. The breathing was then stertorous and jerky.

The stethoscope revealed no sound on the right side, but on the left side one heard exaggerated heart-beats, accompanied by a peculiar gushing noise. The patient died at 2 a.m. the following morning, having lived thirty-two hours after the accident.

A *post-mortem* examination revealed ruptured diaphragm, with stomach, spleen, and a part of the small intestine in the left side of thorax.

Case 2.—An Aberdeen terrier, 14 years old, brought to hospital with the following history: The animal had been turned out on the previous evening, and was found an hour later in the gutter, collapsed, and in great pain. On the morning it was brought to hospital it was obvious that there was severe bruising of the ribs and left fore-leg, which could not be put to the ground. In hospital the dog fed well, and the lameness improved.

On the night of the eighth day in hospital the dog suddenly

began to vomit violently, and the breathing became very laboured. Death took place an hour later.

Post-mortem revealed ruptured diaphragm, with the anterior portion of the stomach in the thorax. The dog had been fed sparingly throughout.

Case 3.—An Irish terrier, 15 months old. It was brought to hospital, but was dead on arrival. An hour previous it had been seized with a sudden fit of coughing, and was observed to be gasping for breath.

A *post-mortem* examination was made at request of owner, and this revealed a rather startling state of affairs. In the peritoneal cavity were two floating kidneys suspended by a broad membrane attached to the lumbar region.

The remaining viscera—namely, stomach, intestines, spleen, pancreas, and liver—were in the thorax, and, further, the wall of stomach was blended or fused to diaphragm. The heart was on the right side, and the right lung was about half its normal size. The owner gave me the whole history of the dog from the age of three weeks. The dog had been with her constantly, and she had no recollection of any accident, but the following points are significant:—

The dog's breathing was always peculiar, and the animal was always breathless after running, however short the distance.

It always had a big appetite, and the abdomen was much distended after a meal and sometimes in pain. It always appeared to want its head supported, and would often rest its chin on a chair. It would cough at odd times, especially after feeding.

One day after a feed of lactol it was screaming and writhing in pain. It had always been noticeable that it could not seem to get into a comfortable position, especially after a meal.

During the last few days before being brought to hospital it had fits of choking and made attempts to be sick. I am convinced from the history and the way in which the stomach was fixed to the diaphragm that the rupture was congenital.

WE publish this month the first of a series of Supplements to be contributed by our Australian colleagues, and which we feel certain will be appreciated by the profession in the United Kingdom. We hope to publish four such Supplements annually.
[ED., V.J.]

Translation.

ON THE PATHOLOGICAL ANATOMY OF MILK FEVER.

THE BLOOD CAPILLARIES OF THE NORMAL UDDER.—A NEW THEORY OF PARTURIENT PARALYSIS.

BY PROFESSOR DR. ALFRED GUILLEBEAU.

Bern.

THE excellence of the treatment of milk fever fills the veterinary surgeon with a just pride. But this improvement has furthered the understanding of the malady but little, as the ever-growing and extraordinarily extensive literature on this matter proves. The discovery of the favourable effect of udder injections which resulted in the year 1897 through the Danish veterinary surgeon Schmidt, of Kolding, was above all a lucky incident. The incident is now, sure enough, an important factor in the life of mankind.

One has presupposed the occurrence of a hyperæmia of the udder in parturient paresis. The milk gland in this ailment is often flaccid and gives little milk but with these symptoms a

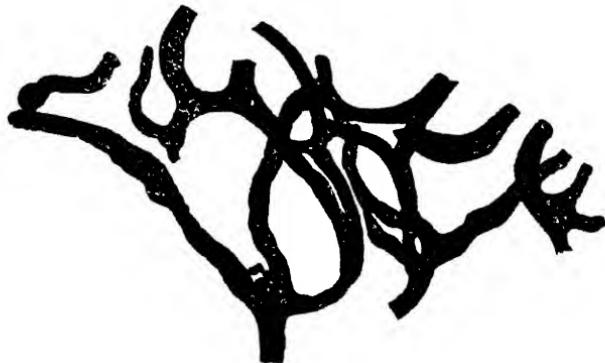


FIG. 1.—Loops of capillary vessels in udder of the cow. Natural injection. Breadth of vessels 6—9 microns. Fixation in chrom-osmium acid.

venous hyperæmia is always present, and the quick cure through the blowing in of gas can hardly depend on anything else but an improvement of circulation. An udder of $17\frac{1}{2}$ lb. to 30 lb. weight will scarcely consist of more than half blood, this blood corresponding in quantity to that of a copious bleeding, and hence the coma is not produced solely by stasis of blood in the udder. The hyperæmia of the vessel may, however, be a part symptom of a generally diffused hyperæmia affecting the hind-quarters, and the therapeutic success be dependent on the circumstance that a powerful general effect can be produced from the udder on the blood-vessels. Blood-pressure determinations by Seitter (Dissertation at Zurich, 1910) showed, in fact, that by

gas injections into the udder the blood-pressure in the cow and goat is considerably raised, and may continue elevated for eight hours. The udder hyperæmia is, as far as I can see, quite a theoretical conjecture; whether it really occurs in fact is a justified question, and this is a matter which deserves attention here. My notice claims to be no more than a reasoned summing up of the pathological anatomy of parturient paresis. But in order to establish my production of proof convincingly, I describe first of all the normal relations of the capillary vessels (see also dissertation in Bern by J. Ibel, 1903).

On the cavity wall of the alveoli lies a polygonal network of capillary tubes (fig. 1). The sides of the polygon measure 12

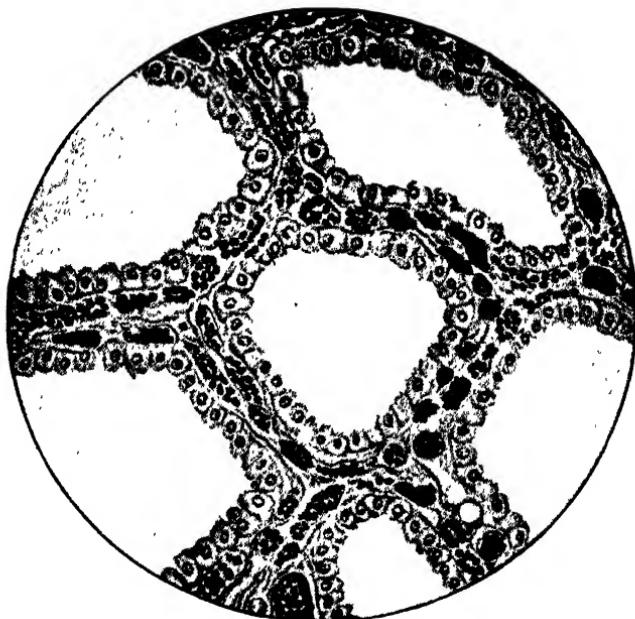


FIG. 2.—Section through the udder of a cow. Natural injection. Breadth of vessels 9—12 microns. Fixation of vessels in chrom-osmium acid.

to 15 microns. But since the size of the alveoli is subject to a great variation according to the degree of their fulness, so the polygonal vessels must correspondingly possess the ability in a considerable measure to expand and contract. The organ of which I give a representation here is, as a result of vascular paralysis, in a condition of natural injection. I believe that the capillaries in an active gland are of the same breadth as in the illustration, but I cannot say definitely. Of the polygons, one only sees, as a rule, in a microscopical preparation oblique and distorted sections.

The walls of the septa between the alveoli are extremely thin, and it is conceivable that the blood capillaries on each side share in the blood extravasation which is necessary for the formation

of milk. The reader may meanwhile notice in fig. 2 that each alveolus has its capillary network. Such a one need not serve two masters. If one alveolus stretches out quicker than the other, yet each retains those circulation conditions which appertain to it.

The illustration concerned is taken from a cow which was slaughtered by order of graduate Bach, of Thun, on January 15, 1903. Several vessels in this section have their maximal diameter. They are in every case much broader than in the normal udder. A few appear to be of normal width. These possibly had a sufficient circulation, in order to be capable of

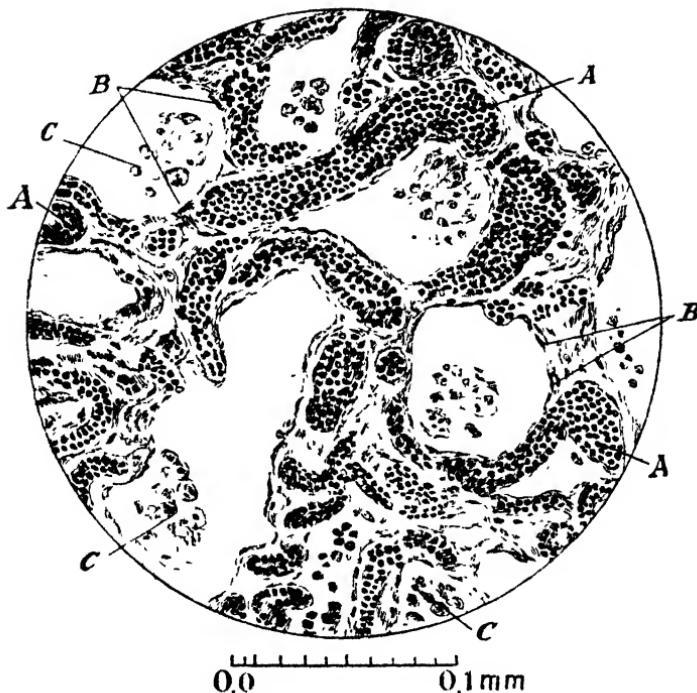


FIG. 3.—Section through the udder of a cow which suffered from milk fever. *A*—Distended capillaries; *B*—So-called basket cells; *C*—Shed gland epithelium.

slight milk secretion in this case. The vessels had the following diameters: Normal gland, 6 to 12 microns; in the case under consideration 6, 18, 24, 30, and 45 microns. The organ was therefore without doubt overloaded with blood, the circulation delayed or pressure raised, and the activity of the udder checked. The blood contains at the most but one or two white blood corpuscles, so that leucopenia is present. To throw light on milk fever, one is concerned in every case with a vessel-widening cause as well as with a nervous influence. It should occasion no sur-

prise to discuss the nerves here, for milk secretion without specific innervation is not understandable. There is a very full nerve life in the udder, and it is very perfectly regulated.

Various matters are concerned in milk formation. Gland epithelium and blood are indispensable. According to Aristotle, "milk is parboiled from the blood," and, in fact, the latter forsakes the blood-stream in the udder in order to change itself into milk. The process necessitates a special structure of vessel and special nerves. How important these anatomical relations are teleangiectasis (a permanent dilatation of groups of capillaries and arterioles) proves.

The case which I give as an example of this anomaly is not new. Stenzel and Hess have described it before. A 5½ year-old milk cow which had calved seven months previously gave no milk out of one of the right quarters of the udder, although the section of the gland was apparently normal. The quarter concerned had never been ailing. The alveoli were smaller, the interstitial tissue broader. It contained two to seven closely grouped blood capillaries of 5 to 24 microns broad, with strong 1 to 5 micron thick walls. Between the vessels were connective tissue nuclei, and between the epithelia leucocytes. The capillaries contained very much blood, but the living ducts were incapable of blood extravasation. As a result, in the first pregnancy there was no great and active new formation of vessels in one quarter, and secretion remained in abeyance.

We presuppose in all cases that the normal maintenance of a tissue with blood-vessels is somewhat independent. Generally it is so, and yet this condition may be absent. Failure or superabundance of vessels is always a fact of great significance. In embryonal life lack of vessels causes giant growth; a superabundance brings about aplasia. An unequal development of vessels and tissue is possible, and these have a varied origin in the embryo. The vessels arise from the vitelline vesicle, and the appropriate penetration into the tissue is very desirable, but not always achieved.

The knowledge of milk fever has experienced a considerable advance through the investigation of anaphylaxia (over susceptibility) (Hutyra and Marek, Van Goidsenhoven, Thum). Anaphylaxia (ana-over, phylax guard or watcher) is a special condition of the organism which arises from a foreign albumen in the blood. The albumen is derived from another species of animal and is consequently not inherent, or it is drawn from an organ of the animal concerned as the lens, placenta, testicles, haemoglobin, milk, and belongs to the *specific organ albuminates*, which are plainly different from blood albumen and are foreign to the blood. The albumen concerned in anaphylaxia is designated as antigen (anti=against, gennao=I produce or generate). The antigen for the production of anaphylaxia is injected directly into the blood-stream or into the abdominal cavity. Subcutaneous injections are little suitable for this object. In the stomach the foreign albumen is generally changed, yet in special cases also from the stomach (*e.g.*, milk in guinea-pigs, strawberries and cancer in idiosyncrasy of men) anaphylaxia

occurs. One circumstance is now very characteristic. The animal does not fall ill on taking up the foreign albumen. There arises, on the contrary, an antibody which gradually does away with the foreign albumen. During the change (nine days to several weeks, according to the amount of the foreign albumen) no antibodies can be proved in the blood because these are bound up with the antigen (pro-anaphylactic stage). After the termination of this period the effective and now free antibodies remain in the organism for a very long time (one half to seven and a half years). The one is attached to the blood and the other anchors in the tissue cells, especially those of the brain. New albumen



FIG. 4.—Section through a cow's udder with teleangiectasis.

arrived there or changed in the blood, then the antibodies unite with it, and a poisonous substance arises which causes severe disturbances. One describes the latter as an anaphylactic choc. Especially important is the fact that this hostile occurrence only becomes present on the taking up of a *sufficient* quantity of the foreign albumen. This has been established by a series of experiments. Repeated intravenous injections at intervals of three or five minutes of at first small and then increased amounts of antigen hinder the choc. The condition of anti-anaphylaxia arises which is not identical with normality, because the individual, as a result of removal of the foreign albumen and freeing of the antibodies, becomes anaphylactic in a typical way.

Anaphylaxia occurs in sucking animals, birds, and cold-blooded vertebrates. In cattle it was repeatedly noticed after simultaneous inoculations against anthrax, because with the protective bodies horse serum also gets admitted to the injection.

Anaphylaxia always shows the same type of symptoms; the form changes but little from one species of animal to another. It is proved by the generation of the choc. As the most im-

portant, never-failing change is a sudden paralysis of brain activity and the vaso-motor nerves, marked by collection of blood in the hind part of the body. The other symptoms correspond to a first irritable and a subsequent paralytic stage of which the first is often short, so that it may be easily overlooked. The symptoms of anaphylaxia in general, cattle anaphylaxia after protective inoculation, and the anaphylaxia of milk fever bear a resemblance in some particulars. There is an irritable stage and a paralytic stage, the phases and symptoms of which resemble each other rather closely. Death may result in the stage of excitement or paralysis. If the animal gets well recovery is very quick. After one to two hours improvement is perceptible; from twenty-four hours to three days all bad symptoms are past. After parturient paresis cows give somewhat less milk.

In experimental anaphylaxia an irregular course is very frequent, because the test subdues many unexpected influences, and this incalculableness is not wanting also in the anaphylaxia of practice. Hutyra and Marek (*Spec. Path. and Therapy of Dom. Anim.*) and Van Goildenhoven (*Annales de Méd. vétér.*, 1910) are of opinion that purtient paresis might depend on anaphylaxia through milk. The casein, which undoubtedly belongs to the specific organ albuminates, is, during the early days of the dry condition, absorbed before parturition. At this time the pro-anaphylactic stage commences, and the anaphylaxia is prepared at parturition. Ernest Hess, in a noteworthy study of milk fever, considers that a long condition of dryness appears to favour the occurrence of the malady. It is quite conceivable that in the re-awakening of lactation after calving the milk flow is upset by stoppages which bring about a reabsorption of the fluid. If this occurs in sufficient quantity then the choc arises, which in this case is known as milk fever.

The udder, besides casein, contains ferments which may also be reabsorbed as specific organ-albuminates. At the end of a lactation period, and at the beginning of the following period, these ferments are present in considerably greater quantities in the udder than at other times. In this connection it may be noted that in guinea-pigs, not only after intravenous inoculation, but even from anaphylaxia produced from the stomach, the subsequent inoculation of milk under the dura mater brings about a choc.

The assumption that the placental albumen or uterine milk in woman (Thum) may produce an anaphylaxia similar to that of milk fever is based on further conjecture than the impeachment of the udder secretion. It must not be overlooked that experiments with milk and placenta in the cow have led to no result, and the whole assumption of experimental proof is lacking. In spite of this there seems little doubt that there is a real relationship between milk fever and anaphylactic choc. Most cows through the dry stage are put in a condition of milk anaphylaxia, but only exceptionally the absorption of the secretion of the udder occurs in quantity after a birth, which must bring about a choc as a result.—*The Swiss Journal of Veterinary Medicine.*

G. M.

The Profession in India.

OPENING OF THE NEW PUNJAB VETERINARY COLLEGE AT LAHORE.

BEFORE describing the proceedings of the opening ceremony performed by His Excellency the Viceroy of India, it will perhaps be better to premise a brief description of the general arrangement and accommodation of the new College, in order to give the reader an idea of the institution in its present reorganized condition.

The College may well be described as *new*, for, although the institution has been in existence since 1882, it has now been removed to a new site, and has been completely remodelled by Colonel Pease, the Principal, the buildings, &c., of the various sections having been planned and arranged in accordance with the requirements of a modern veterinary college and hospital. The College now occupies an area of over 22 acres; and, in addition to this, there are 10 acres of land adjoining the College which have been reserved for a hostel to accommodate 200 students.

The College compound may be roughly divided into three sections, namely, a south quadrangle, consisting of a clinical block on the east with three rows of stables, one each on the north, south, and west. The shoeing-forgo is situated at the south-west corner of the quadrangle, and behind the row of stables on the south is a water-tower and well fitted with an electric pump, affording a constant supply of fresh water. The row of stables on the west side has a special room for the College ambulance car. There is also the house-surgeon's quarters in this section, conveniently situated near the main entrance of the hospital.

The main block of the College is in the centre of the compound, forming the east member of the second quadrangle, of which the anatomical block and the students' operating-room form the south, the dog hospital the west, and the research laboratory the north side. Still further to the north, behind the laboratory, is the infective diseases hospital with its well-isolated blocks of stalls, &c., forming a walled-in section of its own, completely separated from the rest of the College. On the east side of the infected diseases hospital are located the residential quarters for the Principal and for some of the professors; while the quarters for the laboratory assistants, farriers, and menial

servants are built on lower ground on the west of the south quadrangle. The *post-mortem house*, the macerating-room, and the incinerator are also located on the lower ground behind the dog hospital.

The "*Hallen Block*" is the main building of the College, and contains the Principal's office, the clerks' room, the museum, the library, a combined pharmacy and chemistry room, two lecture theatres, as well as professors' rooms, students' common rooms, post-graduate rooms, record room, &c. The "*Nunn Anatomical Block*" has a large, well-lighted dissecting room, an osteological room, anatomical museum, and a lecture room, as well as rooms for the professor and the demonstrator of anatomy.

The "*Pease Research Laboratory*" contains two well-lighted laboratories for professors, a large general laboratory for students, a lecture theatre, as well as offices for the professors and their assistants, and the artist's studio. There are also rooms for the preparation of culture media, &c., and for sterilization, incubation, laboratory animals, &c., also a cellar for cold storage.

The "*Kettlewell Clinical Block*" includes a large shed for the outdoor clinic, an operation theatre for large animals, a dispensary, drug store, instrument room, and a boiler room for hot water. It also has offices for the professors of surgery and bovine pathology, the house-surgeon, and clinical clerk, as well as colic-boxes, irrigating stalls, and a long trotting shed attached to the front of the block.

The *Dog Hospital* has a special block of its own, and contains separate wards for the infectious and non-infectious diseases, an up-to-date operating room, a dispensary, dressing-room for surgical cases, and an office for the professor in charge. It also has a kitchen and quarters for the attendants.

The College, hospital, and laboratory are well furnished and fully equipped with all the modern appliances and instruments; and, in addition to a large professoriate, consisting of the Principal, six professors, and twelve assistant professors, lecturers and demonstrators, there is an ample establishment of ministerial and menial servants in the various sections under the professors in charge.

THE OPENING CEREMONY.

His Excellency the Viceroy performed the ceremony of opening the New Punjab Veterinary College at Lahore on Friday, December 10, 1915. The ceremony took place in a spacious *Shamiana* (marquee), which was suitably decorated, and provided

seating accommodation for more than 300 persons, besides the dais for the Viceroy and the Lieutenant Governor. There was a large attendance of both European and Indian gentlemen, including the Judges of the Chief Court, members of the Legislative Council, and the chief officials of the Province. There were also present some 200 students of the College, including seventy military students in uniform.

His Excellency, who was accompanied by His Honour the Lieutenant Governor of the Punjab, arrived at the College by motor-car from Government House at 11 o'clock in the morning. The Viceroy was received by Colonel H. T. Pease, C.I.E., Principal of the College. The police band played the National Anthem, and His Excellency inspected the guard of honour of the 1st Punjab Volunteer R.Les under Captain Longdin. A procession was then formed at the door of the *Shamiana*, and escorted the Viceroy to the dais in the following order:—

The Lieutenant Governor's Staff; Colonel H. T. Pease, Principal of the College, and Mr. C. A. H. Townsend, Director of Agriculture, Punjab; the Honourable Mr. C. A. Barron, Chief Secretary, Punjab; His Excellency's Staff; His Honour; His Excellency. The Chief Secretary declared the proceedings open.

Mr. Townsend then introduced to His Excellency the following Professors of the College: Mr. W. A. Pool, Mr. W. Taylor, Mr. E. Burke, Khan Bahadur Sayad Gilani Mahtab Shah, Khan Sahib Sayad Gilani Sardar Shah, Kahn Sahib Ghulam Hussain Khan, and Khan Bahadur Dr. Amir Shah (retired).

Mr. Townsend now read an address to the Viceroy as follows:—

" May it please Your Excellency,—It will perhaps be not inappropriate of me, on this occasion of the opening of this fine College, to give a brief history of its career.

" The Lahore Veterinary College sprang from a most humble origin. It owes its inception to the late Colonel Hallen, C.I.E., a member of the old Indian Veterinary Department, and first Inspector-General of the Civil Veterinary Department. Veterinary work in this country is under very great obligations to him; and Indian animals would doubtless, if they were conscious beings, keep his birthday as that of one of their greatest benefactors.

" Colonel Hallen, as a member of the Cattle Plague Commission, and as General Superintendent of the Horse-breeding Department, realized the necessity of some institution in India to impart veterinary education. He knew the havoc wrought by cattle plagues; he also knew how much valuable stock in various parts of the country died from curable diseases owing to the absence of proper attention and medicine. Indian cavalry again and the Transport Corps had no veterinary service, though their need was imperative. Accordingly, in the late 'seventies Colonel Hallen, realizing that there was no chance that any ambitious scheme for veterinary education would be considered at the start, obtained sanction to the formation of a small class for veterinary instruction at the Hapur Remount Depôt in the Meerut district,

and persuaded some district officers and cavalry regiments to send men there for training. Two English veterinary officers carried out the teaching work, which was confined to the more common diseases of the horse. The school did useful work. But the decision of the Government to close the Remount Dépôt at Hapur in 1881 reduced the number of animals available for clinical teaching to the students to such an extent that it was obvious that the school must be moved elsewhere if it was to turn out well-trained men. By the orders of the Punjab Government, a Committee was assembled at Lahore to consider the advisability of opening a veterinary school there. The Committee recommended this should be done, and the recommendation was accepted by Government and the Secretary of State. Accordingly, the Lahore Veterinary School was opened in an old bungalow in 1882, with Inspecting-Veterinary-Surgeon Kettlewell as Principal, and Mr. John Burke, who had been teaching (Mr. Burke's son, I should note, is now one of our most esteemed professors here) at Hapur, as Assistant Professor. As regards other teachers in veterinary science, a serious difficulty arose. none were to be had, so recourse was had to the medical department, who provided two excellent lecturers—Dr. Rahim Khan, who lectured on *Materia Medica*; and Dr. Amir Shah, who lectured on chemistry. The good work these gentlemen did for many years was, I am glad to say, recognized by Government, both receiving the title of Khan Bahadur. The whole of the students were transferred from Hapur, and the Lahore school was in every way an improvement on that which had existed there. More buildings were gradually acquired or erected, and the number of students steadily increased, those who had gone through the school soon showing their usefulness when they passed on to work in regiments or districts. Mr. Burke retired in 1887, and a graduate of the College, Syed Mahatab Shah Gilani, was appointed demonstrator in anatomy; while in the following year two other graduates of the College, Syed Sardar Shah Gilani and Raja Ghulam Hussain Khan, were appointed hospital assistants at the College. All three of these gentlemen, I am glad to say, are still with us as professors; most of them have written text-books on their subjects, and the excellent work they have done has been recognized by the grant to all of them of titles by Government.

"In 1890 Veterinary Captain Nunn succeeded Colonel Kettlewell as Principal, and during his time considerable additions to the buildings were made. In 1896 Captain Nunn was, in his turn, succeeded by the present Principal, Colonel Pease, C.I.E., who remained here till 1907. From that year till 1912 Colonel Pease was Inspector-General of the Civil Veterinary Department, but on the abolition of the latter post in 1912 he returned to his earlier love, this College. Its great success of late years is due in great measure to his enthusiasm for his profession, his organizing capacity, and his energy and hard work. A monthly veterinary journal in Urdu was now started, and vernacular textbooks in all subjects prepared.

"A demand was, however, arising for more highly trained veterinary assistants as the Civil Veterinary Department expanded; the training which sufficed for military requirements was found insufficient for district work. In outbreaks of serious diseases in the Army the British veterinary officers could always be called in to deal with them; the civilian veterinary assistant had to be prepared to do the work without assistance. So, as the result of a conference held in 1899 at Ambala, the course of instruction was lengthened and many new subjects added.

"The abolition of the Ajmer Veterinary School in 1904 necessitated a further increase in our buildings, as all the students and the three Indian professors were transferred here, and the European staff was also strengthened. A still further elaboration, however, of the course of training was rendered necessary before many years had elapsed by the expansion of district work and the increased use of sera and vaccines in combating contagious diseases; it was also essential for the more highly trained men who were required for district work to fill the newly created post of Deputy-Superintendent. It was accordingly decided in 1914, while keeping the ordinary three years' course for military students, to introduce a four years' course for civilian students, and also to institute a post-graduate course in English to last for one year.

"Meanwhile the King Edward Memorial scheme necessitated the removal of the College, in order to make room for the Medical College, to its present site, and the result has been the erection of this fine building. I will not waste Your Excellency's time in describing the buildings to you; a short personal inspection will, I hope, prove to you that we have now a very fine College, certainly the best in the East, and equalled by few in Europe. There is a large staff of professors and lecturers, and everything necessary for a sound veterinary education has been provided. The cost of this building and the site, which is nearly 23 acres in extent, is six lakhs and seventy-one thousand (6,71,000) rupees. Our best thanks are due to Mr. Sullivan, the Government architect, to whom we are indebted for much of the excellence of the design; and to Mr. Dorman, executive engineer, and his assistants for the good work done in the erection of the building.

"Ever since its inception the College has been most popular and most successful. It has turned out many hundreds of students, who have done excellent work both in military and civil life. Many old students of this College are on active service with His Majesty's Forces in France and Mesopotamia. Although the classes are large, the number of applicants for admission has always been far in excess of the vacancies. Much of this success is due to the fact that this is the only veterinary college in India in which, apart from the short post-graduate course mentioned above, all the teaching is given in vernacular. This enables us to get as students men from the agricultural classes accustomed to handle animals, and many of these men do not know English, but are none the worse veterinary practitioners on this account.

"I have already mentioned what the College owes to Colonel Pease. It owes much to all its professors; among them perhaps the most prominent have been Messrs. Kettlewell, Nunn, Smith, and Gaiger. The more prominent of the Indian professors I have already mentioned. I would add to the name of those already mentioned Ghulam Rasul. I now ask Your Excellency to declare the College open."

THE VICEROY'S SPEECH.

"Your Honour, Ladies and Gentlemen.—The address that has just been read has given us a most interesting account of the development of veterinary teaching in the Punjab from very small beginnings, and Colonel Hallen would have been a proud man could he have lived to see this day and realize that this splendid College has been evolved from the small class for veterinary instruction that he originally started at Hapur. That class contained the nucleus of a great idea that has gradually developed and forced its way to the ample recognition we see bestowed upon it to-day.

"But I do not think that this result would have come about unless the successors of Colonel Hallen and the professors and lecturers, who have done such excellent work, had played their own part with zeal and enthusiasm, and these qualities have been especially conspicuous in the present Principal, Colonel Pease, who, after five years' absence on other duties, returned to the College, and now has the happiness to see crystallized in this building the result of many years of effort, thought, and labour. I have been particularly interested to learn that the main course of studies is conducted in the vernacular, while English is the language of the post-graduate course. There is more than one school of thought as to whether the medium of instruction in our higher educational institutions should be English or the vernacular, but I think few will be found to question the wisdom of the policy adopted here, for many of those who are most fitted by their home surroundings for a useful veterinary career have neither the time nor the inclination to become versed in the Western culture, and it is hardly open to question that it must be far easier for them to imbibe a knowledge of veterinary science when imparted in their own tongue than if it was complicated by the mysteries of a foreign language. On the other hand, post-graduate courses necessitate the study of a wider range of literature, and there are obvious reasons for their being conducted in the English language.

"These buildings have been designed on a generous scale, and it is well that it should be so, for the demand for veterinary experts is rapidly increasing. The number of students has just doubled in the past ten years; and whereas twenty years ago there were only twenty-six veterinary dispensaries in the old undivided province of the Punjab, there are in the present province no fewer than 121. In the same period the number of animals treated has risen from 50,000 to 400,000.

"The address claims that this is the finest veterinary college in the East, and I can well believe it is true, nor is it altogether unfitting that the Punjab should take the lead in veterinary enterprise. This province has long been famous for its breeds of cattle and horses, the bullocks of Hissar, the buffaloes of Rohtak, the cows of Montgomery, and the sturdy speckled cattle from the Dhani Tract of the Salt Range are all well known to fame, while the horses from the Dhani Tract and Dera Ghazi Khan have more than a local reputation. The *Sardars* and *Maliks* of the Punjab have always loved their horses; perhaps that is partly the reason why more has been done in this province than in any other for horse breeding. The horse-breeding scheme in the Lower Jhelum Colony has recently been subjected to a very severe test on account of the demand for remounts due to the War, and has been able to meet it with conspicuous success. Under the operation of this scheme there has now for several years past been an average of something like 1,800 foals born every year, and it is believed that the limit has not yet been reached. It is hoped that in a year or two Government will be able to rely on a steady supply of a thousand mules a year from the Lower Chenab Colony alone. Of the four grantee Camel Corps at Lyallpur, three have now been called up for active service. Large areas of land have been set apart on the Lower Bari Doab Canal for the encouragement of horse and mule breeding, and under the conditions of that scheme the grantee will maintain no less than 7,000 mares for breeding purposes.

"We have been told that many old students of the College are at the front on active service in France and Mesopotamia, and they will there have opportunities of first-hand observation of the wonderful work that is being done under the auspices of the Blue Cross Association to alleviate the sufferings of sick and wounded horses. I have no doubt that they, like their brothers in the fighting forces, will play, and have played, their part in maintaining the high reputation of India, and I can wish the College no better fortune than that the young men who pass out of her portals may bear upon their brows the seal of enthusiasm for their profession, and carry, wherever they go, a reputation for care and skill and tenderness for these dumb creatures to whom mankind owes such a heavy debt of gratitude.

"I congratulate all who have had a share in bringing this building to a successful completion, and not the least Mr. Sullivan, whose architectural designs have so happily materialized, and I now declare this College open."

At the close of his address the Viceroy was conducted round the College buildings by Mr. Townsend and Colonel Pease. The Viceroy's party also paid a tour of inspection, escorted by the College professors. When leaving His Excellency was given a hearty send-off by the students and visitors, and accorded three ringing cheers.

E. BURKE,

*Lahore, India,
January 19, 1916.*

*Professor of Surgery, Punjab
Veterinary College.*

ARMY VETERINARY SERVICE.

TEMPORARY Lieutenants relinquish their commands: E. J. Nicholson, H. Bidlake. To be temporary Lieutenants: J. B. A. Hare, T. W. Smith, H. Jewell, W. J. Moody, F.R.C.V.S., J. E. Syme.

Captain W. H. Savage, from the Welsh (Carnarvon) R.G.A., to be Captain.

Temporary Lieutenants to be temporary Captains: M. Pilkey, G. H. Ward, J. H. Laurie, E. V. Hobbs, J. O. Guertin. Christian names of temporary Lieutenant (now temporary Captain) Joseph Orpha Guertin are as now described.

T. C. Howatson to be temporary Lieutenant

Major R. L. Cranford to be temporary Lieutenant-Colonel while holding an appointment as Assistant Director of Veterinary Services. Surname of temporary Captain H. E. Whitemore is as now described. Temporary Lieutenants to be temporary Captains. W. D. Brand, C. E. Wolfe, R. D. Macintosh, J. L. Williams.

NOTICE TO OUR READERS—SHORTAGE IN PAPERS.

The Government are now restricting the imports of certain articles and material, among them the pulp used in the manufacture of paper, and they have invited the paper and the allied trades to cut down their consumption at least one-third.

There are several ways in which the reading public can help to minimise wastage, and among these the following is most useful. Many readers subscribe to the office, or through their newsagent, but there are a great number who are chance purchasers at newsagents, or who miss buying a copy one week and occasionally purchase a paper. This results in publishers having to print a number to meet the demand of the occasional and chance reader, and under such conditions they cannot be sure of the actual number required.

This shortage of paper supply also compels publishers to reduce the size of the papers proportionately.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

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THE
VETERINARY JOURNAL

APRIL, 1916.

Editorial.

SCIENCE.

THERE has been an outcry in this country recently about the necessity of a knowledge of science in political and State circles. The agitation was justifiable. Some time ago there was a loud call for a business man, one of "push and go," to put the affairs of the country straight. This was the politician's idea of the type of individual required. The demand revealed the clouded mind of those who sought their country's good. A business man may be anything from a rogue to an honest man, he may be "fish, flesh, fowl, or good red herring," a sweater of humanity to a just employer, an unjust steward with philanthropic leanings to a skinflint with moral maxims, a man of penurious habits who makes all he can to the uttermost farthing, and gives neither his employees nor country their due, to an astute operator in goods or stock whose reward is in inverse proportion to the effort expended in obtaining it. All such may be described as business men. Were any of them the type of men the country wanted? We think not. The proper need was for a good organiser and administrator with a scientific knowledge of the business he was supervising. This is not synonymous with the appellation—"a good business man." Profit and plenty of it is the chief axiom of the business man, but efficiency, corresponding productivity, avoidance of overlapping, and a good output is what the nation needed. The question of profit was a minor and subsidiary one.

In all operations, both military and civilian, in connection

with the War there is more science evident to-day than there has ever been. The progress towards the desired end has been slow, for "science moves but slowly, slowly creeping on from point to point." In industrial circles there has always been an average of it, but its lack has been chiefly noticeable in the ranks of leaders, teachers, politicians, and business men. Science here at the present time has come partly into her own because of *force majeure*, and there being no help for it. Many years ago Huxley tried to impress on the centres of learning the importance of the teaching of science. His efforts produced good at the time and for some years after, but "Let Newton be and all was light" was soon forgotten and quickly again "Nature and Nature's laws lay hid in night" as far as the universities were concerned.

In our own domain the importance of science cannot be overestimated. A full acquaintance with all the vagaries and intricacies of animal diseases and the earnest and keen inquiry into the origin of what we wonder at are no less important and desirable than the smooth, knowledgeable, and maximum output of animal life. For many years we shall have to look for advances in science in other fields than those of mid-Europe. If we wish to do the best for our own country and Empire we shall foster, encourage and support Dame Science in our own domains. In this War the Colonies have come nobly to the support of the Motherland. There is reason to believe that in the future they will play a very important part in the march of science generally and in our own profession particularly. The steps already taken by them are apt to be overlooked. Good research work into animal diseases has already been conducted in India, Canada, South Africa, Victoria, New South Wales, and New Zealand. Some of the diseases investigated are common with us. Clinical records have come in fitfully, but there is hope that from Australia, thanks to the efforts of Majors Woodruff and Hobday, we shall in future get a fair supply.

The advance of science can only be achieved by constant effort. Inertia is less prevalent in children and youths than parents, and perhaps this is why funds have been more liberally supplied to the offspring to conduct scientific operations than to the parent stock. The science of science, however, is to bind together all scientists into one homogeneous whole.

G. M.

General Articles.

INFECTIVE VENEREAL GRANULOMA OF THE DOG.

By FRED. C. MAHON, M.R.C.V.S.

Southampton.

THIS disease is so important a one, in my opinion, that I purpose, as briefly as is possible, to condense any facts and observations I have gleaned in a large experience for many years amongst our canine patients. From notes I have culled from the works of E. Wallis Hoare, F.R.C.V.S., Hutyra and Marek's "Pathology and Therapeutics of the Diseases of the Domesticated Animals," I note that the synonyms are "infective venereal granuloma of the dog, infective sarcoma, lymphosarcoma, vaginal warty growths, fungating excrescence." This disease of the canine species affects chiefly the mucous membrane of the vagina in the female and that of the sheath, or vaginam penis, of the male, and is characterized by warty or cauliflower excrescences or growths, which are transmissible chiefly by coition and by inoculation.

History.—The disease is mentioned by Blaine, and is stated by Hertwig, who has given a good clinical description of it, to be contagious. It did not, however, attract much notice until 1877, when Nowinsky, a Russian scientist, made known his researches on its transmission by inoculation into the vagina and under the skin.

In 1889-90 Wehr also appears to have studied the disease, and since then numerous other investigators, including Duplay and Cazin, Geissler, Bellingham-Smith and Washbourne, Powell White, Sanfelice and Bashford, Murray and Cramer devoted much time to it.

Etiology.—S. F. Beebe and James Ewing, of the Huntingdon Fund for Cancer Research and the Department of Pathology, Cornell University Medical College, found a spirochæte in the lesions of one case, but were not successful in seven other clinical cases. In 1907 Mettam found a similar organism. Probably these are normal saprophytes of the gastro-intestinal canal, and the spirochætes only accidentally invade the lesions.

The causal organism is therefore yet to be found and demonstrated. All that is known with reference to its causation is that the disease is conveyed by coition and inoculation.

In human syphilis a spirochæte—the *Spirochæte pallida*—has been demonstrated to be the cause of that malady, for which Metchnikoff endeavoured to find a trustworthy combative serum, and Ehrlich has introduced a synthetic remedy known as “606.”

The toxins of the tumours have been known to set up acute interstitial nephritis when injected into dogs.

As regards its geographical distribution, it has been observed in England, France, Germany, Russia, and the United States of America extensively.

It attacks both sexes, especially the young and mature adult used for breeding purposes. It is rarely seen in those animals not bred from.

Some breeds are more susceptible to its malign influences than others. British and French miniatures of the bulldog head the list, then the pug. It is rarely found in the fox-terrier.

During the past nine months I have encountered it in a male fox-terrier and in a spaniel bitch of the Sussex type.

At p. 208 of Sewell's work (A. J. Sewell, M.R.C.V.S., “Dog's Medical Dictionary.”) he adds, referring to growths on the penis, “Dogs, especially those used for the stud, and particularly bull-dogs, are liable to growths on the penis.”

They are red in colour, and not unlike a raspberry in appearance. The dog suffering in this way often has drops of blood at the orifice of the prepuce. These growths are contagious, and a dog suffering from them should on no account be used for stud purposes. The growths may not only be on the point of the penis, but may be situated far back. In two cases at death's door recently which have come under observation, I found on careful *post-mortem* examination such growths affecting the penis as far back as the perineum and serious mischief to the lymphatic glands, with interstitial nephritis well pronounced (Mahon).

Professor Hobday, p. 173 “Manual of the Practice of Veterinary Medicine,” briefly touches upon growths in connection with the penis of the horse, usually in connection with the glans penis, and of which, he adds, some are malignant.

Maladie du coit (pox) in the horse appears to be known very much in America. I have only once encountered it in England, and the animal was imported from Canada.

Touching on the spirochætes that have been found, we may also allude to *Bacillus coli*, which closely resembles the typhoid

bacillus in many of its characters, and is a normal inhabitant of the healthy bowel in man and other animals, and is often the only organism present in suppurative conditions connected with the intestinal and urinary tracts in man, in whom treatment by vaccination has been attended with marked success.

Take this spirochæte again. How do we know but that it, too, undergoing varying conditions, may not take on grave changes and prove of great importance in "infective granuloma" of the dog? To my mind we are still very much in the dark as to many of the micro-organisms we find present in many diseases.

Reverting again to "infective granuloma" of the dog, the causal organism has yet to be found and demonstrated. All that is known with reference to its causation is that the disease is conveyed by coition and inoculation. So far this materially helps us. For we should primarily not breed, or cause to be bred from, any male or female animal whom we suspect or find, even in the very earliest stages of the disease. Treatment is generally lengthy. We should not attempt to breed from such animals, if we act aright to our clients and do justice to ourselves, as the disease is to my mind a very serious one indeed.

As a comparison, take the human subject and note how vaccines play an important part or *rôle* in a serious disease. Take, for example, the uses to which "gonococcus vaccine" has been put.

Now this vaccine is prepared from cultures of gonococcus (Neisler) obtained from cases of acute urethritis. It is issued for use in the treatment of genito-urinary infections caused by this microbe and the conditions associated therewith, gonorrhœal rheumatism, iritis, &c.

ACUTE GONORRHœA.

Favourable results have been obtained in a good number of cases, and are to be expected when the patient will submit to a *regimen* of rest during the stage of acute inflammation. Unfortunately, this is where veterinarians are so seriously handicapped in dealing with patients, for this is almost a task impossible in our sphere of influence.

If these conditions are not fulfilled, even so far as the human subject is concerned, excessive auto-inoculations are likely to occur, and will militate against a satisfactory response to the inoculations of vaccine.

CHRONIC URETHRITIS.

It frequently happens an acute urethritis in its later stages gives rise to a secondary infection of the urethral mucous membrane, e.g., by diphtheroid microbes or staphylococcus, and that in the discharge which persists under these conditions few, if any, gonococci are to be found. In such cases little benefit is to be experienced from the employment of "gonococcus vaccine," and treatment should be directed to the elimination of the secondary infection.

Again, in affections of the eye "gonococcus vaccine" may be successfully employed sometimes.

If vaccines prepared under the above conditions are applicable to the human subject, I think the idea an open one so far as the patients of the veterinarian are concerned, for a vaccine to be obtained whereby the same measures that apply to the human subject can be used experimentally at least on the dog, horse, &c. From an ameliorative point of view alone they should be tried.

Whilst penning these lines *The Veterinary News*, February 12, 1916, has come under observation, and I reproduce seriatim the notes headed "A Medical Authority on Veterinary Science."

"The steady growth and development of veterinary science is to be welcomed, not only for itself as a matter of utility or as an abstract science, but also for its possibilities with reference to the human subject," says the *Medical Press and Circular*.

"In this department pathology is perhaps that branch which at the present moment appears to open up the widest vista, the comparison of lesions found in the human type with those occurring in the lower animals being of the greatest interest and value.

"In matters bacteriological and veterinary, at present we stand but upon the threshold, but it is not unreasonable to conceive that the study of infection in man and in the animal by proceeding side by side might throw much light one upon another, and come to be a source of mutual strength and progress.

"Much, if not all, of human physiology has been based upon the accurate study of animal function; if the same laws apply in health as found by experimental investigation, why not in disease, if we but study the phenomena closely? And in the matter of therapeutics much experimental work might be done upon animals

with a justification which similar procedures in the case of man would lack.

" Veterinary medicine is replete with possibilities, and, in addition, at the moment the profession is not overcrowded so far as we are aware."

This bears out my ambition, since I became a veterinarian, to study closely the diseases of man and the lower animals so-called, to look for resemblance in disease, and try and find as far as is possible the inter-communicability of one disease in man to animal, or animal to man. I believe we are, with all research, observation, &c., still only on the margin of an unknown world of science, which the years to come will, if the reins are seized confidently and courageously, teach us, both medical and veterinary practitioners, that there is a good deal in common in the ills that all flesh is heir to. At some future date I hope to produce a few facts gleaned from observations not only on syphilis of the dog, but also some researches so far as man is concerned from a comparative point of view.

As far as observation and research goes in human medicine, " gonococcus vaccine " appears to play an important part. This vaccine is prepared from a culture of gonococcus (Neisler), obtained from cases of acute urethritis. Favourable results have been obtained.

A minimal effective dose of gonococcus vaccine (500,000 to 2,000,000) is an appropriate dose during the acute stage of the disease, and should not be exceeded lest a negative phase of immunity should be induced and opportunity be afforded for the spread of the infection to joints, epididymis, &c. Such minimal doses should be repeated at intervals of two to three days, and may be cautiously increased if necessary to 3,000,000 or 5,000,000 after the acute symptoms have quite subsided.

Vulvo-vaginitis in children has been successfully treated by gonococcus vaccine.

Hamilton (*Journ. of Amer. Med. Assoc.*, 1910), in an analysis of 344 cases, found that the average duration of treatment in eighty-four inoculated cases was 17 months, as compared with 10·1 months for 260 children treated by irrigation. 90 per cent. of the inoculated were considered cured, the absence of gonococci in several successive examinations being taken as the criterion of the cure. Six inoculations sufficed for the cure of most acute cases.

Butler and Long (*Journ. of Amer. Med. Assoc.*, 1908, pp. 744 and 1301) also attempted a comparison of smaller groups of "vaccine and irrigation" cases, and obtained results favourable to vaccine therapy.

If such be accomplished with the human disease, I believe veterinarians could prepare a vaccine from cases in the dog and horse with like beneficial results.

Dosage (human).—Minimum effective dose, 500,000 to 2,000,000; medium doses, 5,000,000 to 25,000,000. The vaccine is issued in dilutions containing 5,000,000 and 50,000,000 gonococci per c.c.

Since writing my article, Mr. William Scott, F.R.C.V.S., Bridgwater, *re* extract from *Veterinary News*, November 1, 1913, touches broadly on the *Bacillus coli communis*, and says the kidneys may be, and often are, the seat of active *B. coli* invasions. In the female, particularly after parturition, it is probable that the infection is urogenic in origin, and this point is rather substantiated by the fact that in practice one seldom sees specific bacterial invasions of the kidneys in the males unless they are of haematogenous origin.

Immunization.—The animal body possesses a considerable degree of natural immunity to *B. coli*, and this may be due to the fact of their continual presence in the intestinal canal, where absorption of a certain quantity from the intestinal mucosæ of their toxins must take place, and, reaching the blood-stream, stimulates the production of antibodies, agglutinins, opsonins, precipitins.

Artificial immunity may be acquired by infecting vaccines derived from devitalized bacteria, preferably autogenous vaccines, failing which polyvalent stock vaccines, combined with a polyvalent coli, should be used.

Since I asked whether it is not possible to procure a vaccine for the organism which plays an important rôle in infective granuloma of the dog, &c., I have learnt that Parke, Davis and Co. prepare a "colon vaccine" in the form of hypodermic tablets, each containing 100,000,000 and 500,000,000 killed bacteria respectively. When occasion arises I hope to use these extensively, as I am convinced all other treatment is merely palliative, not curative. Moreover, I pin my faith largely to "vaccine treatment" as when used by me, especially the preventive vaccines, my success has been marked.

Mr. W. Scott's, F.R.C.V.S., article, reprinted in *Veterinary Notes*, January, 1916, issued by Parke, Davis and Co., is a welcome addition to our knowledge, and I personally tender him my sincere thanks for his ever-progressive investigations and records on what hitherto has lain dormant or unknown to veterinarians.

GAS POISONING.*

BY PROFESSOR L. HILL, M.B., F.R.S.

SYMPTOMS AND LESIONS OF THE LUNGS IN EXPERIMENTAL ANIMALS.

ANIMALS exposed to chlorine exhibit first of all profuse watering of the eyes and salivation; they make efforts to escape, and if the chlorine in the chamber is not mixed by a fan but sinks to the lower parts, they hold up their heads as high as possible to escape breathing the more concentrated lower stratum. The respiration soon becomes quickened, and then, as the oedema of the lungs and exudation into the air-tubes increases, the respiration becomes slower and laboured. The obstruction to the entry of air becomes great, and in consequence the lower ribs are drawn in with each inspiratory gasp. The mouth gapes open, and a frothy secretion hangs round the orifices of nose and mouth. The whole effort of the animal is given up to breathing; finally it falls over exhausted, the breathing becomes rarer and shallower, and it dies. If in the stage of laboured breathing the animal be removed from the poison, it generally dies during the next twenty-four hours, but may live longer, to die within the next few days. One of our animals died as late as a fortnight after the exposure.

Examination of the lungs of those which die in the first twenty-four hours shows an intense congestion of the lungs; they are dark red in colour, a more or less solid oedema prevents their collapse on opening the thorax. The air-tubes contain frothy exudation, which, on cutting the lungs, exudes in large quantities. When the lung of a rat was kept in a covered dish it shrank like a blood-clot, exuding serous fluid till it floated in it.

The animals which die in the later days show more or less

* Paper read before Medical Society of London, November 29, 1915.

extensive patches of red hepatization. Those parts of the lungs which were least poisoned appear relatively normal, but are more rosy in colour. Microscopic examination was carried out on the animals poisoned by us by Professor William Bulloch. The sections show intense congestion and small haemorrhages in places, and an oedema which fills the hardened alveoli with an eosin-stained homogeneous coagulum, reminding one of the appearance of the thyroid alveoli filled with colloidal secretion. The coats of the arteries are enormously distended with exudate, giving a most remarkable picture. The epithelium of the air-tubes is in many places detached. The animals die in the early stages from asphyxia, and in the later stages from pneumonia, with consequent absorption of toxins and exhaustion.

In those animals which are less severely poisoned the laboured breathing gradually passes away; those that recover appear quite normal at the end of a fortnight. Their fur, which was made sticky and looked, so to speak, burnt at the ends, becomes glossy again, the damaged hairs being shed. These animals, if killed during the process of recovery, generally show small pneumonic patches. The lungs seem very sensitive to further injury during the period of recovery; inhalation of chloroform may cause in them an acute oedema, and drown the animal.

There seems no reason why recovery of the lungs should be any less perfect after chlorine poisoning than it is after bronchopneumonia. The damaged and shed epithelium of the air-tubes can be replaced, and the pneumonic patches resolved by the absorptive action of the phagocytes, until repair is complete.

I have no evidence to offer as to the state of the lungs at any long period after the poisoning.

The remarkable fact that some parts of the lungs are far more severely damaged than others requires an explanation. When chlorine of, say, 1 in 1,000 is driven into the lungs by artificial respiration, and the lungs are exposed and observed from the start, it is evident that the poison reaches and severely damages certain parts on the surface while other points remain normal. In these experiments the current of air from the pump was driven through chlorine water and then passed into the windpipe. We must suppose either that the chlorine does not uniformly mix with the air, or that certain air-tubes are shut up by contraction of the bronchial muscles and so prevent the poison reaching the alveoli they supply.

There is no doubt that the first effect of a concentration such as 1 in 1,000 is to cause contraction of the bronchial muscles and diminish the expansion of the lungs. Using enormously strong concentrations, Sir Edward Schäfer finds no evidence of such contraction—probably the concentrations he used rapidly killed the lining membrane of the air-tubes, including the muscle. Some experiments conducted by F. J. Twort and myself on the oxygenation of the blood, in subjects breathing in a shallow way, suggested to us that parts of the lungs may then not be expanded nor the blood oxygenated in these parts, and that the bronchial muscles may regulate to which part of the lungs the air goes on each inspiration. The results of our chlorine experiments seem to confirm this view.

Treatment.—For the severe cases of chlorine poisoning the object of treatment must be that of getting rid of the exudation in the air-tubes which is drowning the victims. Experiments on animals show that the frothy fluid can be easily squeezed out of the lungs and trachea by rhythmic compression of the thorax, and that the dyspnoea which is threatening life can be greatly, if only temporarily, eased by this means. Artificial respiration is reported to have given good results on several of the cases on which it was tried. The artificial respiration requires to be repeated as often as the dyspnoea becomes excessive. The case is recorded of one man, almost moribund, who was treated in this way on four successive occasions, and who ultimately recovered. After squeezing out the fluid, air may be blown into the lungs by mouth-to-mouth artificial respiration, to overcome the resistance of the froth in the smaller tubes and expand enough lung to keep the patient alive. It is true that emphysema may be caused by so doing, but if it is a question of just carrying a man through the threatened asphyxia, one cannot hesitate to get air into the lungs by these means.

I took over to Flanders an apparatus constructed by Messrs. Siebe, Gorman, called the Vivator, in which there is a foot-pump which feeds a face mask through a flexible tube. By each down-stroke a measured volume of air, or oxygen, is pumped into the lungs, by each upstroke a valve is opened which allows the air to escape from the lungs by the elastic recoil of the thorax and lungs. With this apparatus respiration can be kept going in the collapsed or unconscious cases, the fluid now and again being evacuated by squeezing the thorax and by posture.

The inverted posture will help to drain out the fluid. I was told that several of the patients of themselves hung their heads

down over the side of the stretcher, or table, in order to aid their expectoration.

Emetics have proved very useful in giving relief to the less critical cases. Half a pint of salt and water, or 8 gr. of copper sulphate, followed by large draughts of lukewarm water, are recommended. A brush, or the patient's finger, put to the back of the throat will initiate the vomiting without delay. The act of vomiting is reported to cause the expulsion of a large quantity of the frothy fluid.

Administration of oxygen relieves the cyanosis and improves the condition of the subjects.

Not only does the percentage of carbonic acid in the blood rise in the suffocative condition, but other acids, such as lactic acid, increase in quantity owing to the lack of oxygen. When the blood is oxygenated by breathing of oxygen, these other acids do not appear, and the acid intoxication is therefore so far eliminated. Tests of the power to hold the breath show that a higher percentage of carbon dioxide can be borne when oxygen rather than air fills the lungs. To give oxygen to a man who is struggling for breath and needing to expectorate is no easy matter. It is difficult to get tolerated any kind of close-fitting face mask. The ordinary clinical method of administering oxygen through an open funnel held near the mouth and nose is of relatively small value; nearly all the oxygen is wasted by escaping into the atmosphere; just at the period of inspiration the stream is not enough which reaches the mouth and nose, so that the air drawn into the lungs is but very slightly enriched. I have found the oxygen in my alveolar air increased by only 1 or 2 per cent. when oxygen was administered to me by a sister in a London hospital. If a loose kind of face mask be made out of a towel, and the oxygen tube be led under that, and the oxygen sent in sufficient stream to blow away the exhaled carbon dioxide, then 70 per cent. of oxygen can easily be obtained in the alveolar air. Down Bros. have made a transparent face mask on my design fitted with a curtain which drapes the face, by which oxygen can be effectively given on this plan—but not economically. A 20 ft. cylinder is soon blown away by these methods. To give oxygen economically, a well-fitting face mask, breathing bag and cartridge for absorbing the exhaled carbon dioxide must be used. The subject breathes through the cartridge in and out of the breathing bag, which is filled with oxygen from the cylinder as required. The cartridge is loosely packed with small pieces of caustic soda-coke; to prepare these the coke pieces are heated red hot and dipped into strong caustic soda. They offer a splendid absorbing surface and no appreciable resistance to the breathing.

This apparatus is made by Messrs. Siebe, Gorman. I took over some for use in Flanders. The difficulty in using such lies in keeping the mask over the face of a man who wants to struggle and expectorate. Oxygen breathed between the periods of expectoration will undoubtedly give him relief, and with the above apparatus a 20 ft. cylinder will give a supply lasting many hours.

Experiments on animals have showed us that compressed air relieved the dyspnoea to the same extent as oxygen does. On placing a patient in a medical air-lock, such as is used in compressed air tunnel works, and compressing him to two atmospheres, he would breathe double the concentration of oxygen, and at the same time would be able to expectorate and struggle as he pleased. The compression of the air when first applied would halve the size of the air bubbles in the frothy liquid which obstructs the air-tubes, and this should give relief by lessening obstruction. Artificial respiration could be applied in the compressed air chamber, and the subject be kept in it for several hours, and then slowly decompressed. The medical locks are fitted with air-locks, through which the medical officer can enter or leave. The difficulty, of course, lies in the provision of such medical locks, heavy cylindrical boiler-like structures, each of which would hold only four or five patients, with the necessary oil-driven compressor engine. A small medical lock and engine would go on a three-ton lorry, but it is a serious thing to hamper the transport of the Army with such a provision. There is another way in which oxygen might be administered without the use of a mask, and that is by drawing over the stretcher containing the patient a cylindrical balloon, say 10 ft. by 4 ft., tying up the end, and then distending the balloon with oxygen.

The giving of atropine has been extolled on the theory that it lessens secretion of fluid and dilates the bronchial tubes. In severe cases of poisoning we have not found it of the least service.

It is claimed that the inhalation of stramonium vapour from cigarettes relaxes the bronchial muscles; this may afford relief in the mild cases, which recover whether so treated or not.

The chlorine poisoning of the lungs is comparable with extensive burns of the skin, and the same general treatment to support strength and lessen the shock is required. Just as septic infection of the skin is the sequel of the burn, so pneumonia and bronchitis follow chlorine poisoning. In our experimental animals severe poisoning has in every case had this end, and we know of no means of preventing it. Warmth and good nursing might pull a man through; these conditions are difficult to apply to animals.—*From Journal of Royal Army Medical Corps.*

THE GOAT AS A SOURCE OF MILK.

OWING to the usual arrangements in dairying by which milk is sold under contract to distributing agencies in towns, or made locally into butter or cheese, it sometimes happens that cottagers and others living outside the area of retail delivery find it difficult to obtain milk for their families. In these districts goat-keeping might be extended with great advantage. All the objections which apply to the keeping of a cow by a cottager would be met in the case of a goat. The first expenditure for its purchase is within his means; the housing accommodation is reduced to a minimum; the food costs very little; and there is no great expense to be borne for the maintenance of the animal. Even where cow's milk is readily obtainable, however, goats may be profitably kept to supply milk for domestic use.

Unfortunately there has been for many years a widespread belief that goats' milk possesses a peculiar flavour. Not only is there no justification for this belief, but, on the contrary, the rich creamy taste of the milk renders it more attractive to the palate than cow's milk. Goat's milk, moreover, possesses two special qualities which alone should make it popular, viz., (a) it is easily digested by children, and especially infants, and (b) it is far less likely than cow's milk to contain tubercle bacilli of animal origin.

How to start Goat-keeping.

One of the greatest difficulties which beset the prospective goat-keeper is to obtain suitable stock. The best specimens of goats are frequently exported, and as no fresh stock can be imported from abroad to replace them, it is necessary to depend entirely on home-bred animals. There is, however, still a fair number of common goats available, and beginners will find it best to commence with one of these, costing up to £2 or £3, and to improve their stock gradually.

Characteristics of Milk Production.

In selecting a goat, it is well to remember that there are certain features which may be regarded as characteristics of milk production. The body should be long and fairly deep, although if the latter point is very marked, it is probable that

the animal is aged. It is important that the ribs should be well sprung, whilst a long head and a slender neck are generally considered to indicate a good milking strain. If the goat is dry the quality of the udder cannot be ascertained, but if in milk the udder should be carefully examined. It should not only be of good size, but soft and pliable, and the teats should be long and pointed, as they are then most easily handled. It is always desirable for the purchaser to see the goat he is about to buy milked at least once before coming to a decision. This is necessary not merely to ascertain the actual yield, but to find out if the animal stands quietly while being milked. A goat purchased in milk should not be less than two years old or over five. The age can be detected by examining the teeth, for particulars of which the reader should refer to the various books on the subject.

The Breeds of Goats.

In this country there are at most five breeds of goats, two of which belong to what may be called the common kind, and three to the improved varieties. The "common" type are the English and the Irish goats, the former being short-haired, with horns rather short and branching outwards, and the latter long-haired with more upright horns. Both are prick-eared and, with slight differences, resemble the common goat in other parts of Europe. The superior breeds in their order of value as milkers are the Toggenburg of Swiss origin, the only strictly pure breed in Britain, and the Anglo-Nubian, now regarded as a separate breed, but produced many years ago by crossing the English goat with stock imported from the East.

In addition to these breeds there are what are known as "Swiss" and "Anglo-Swiss," the former being a cross between the Toggenburg and other Swiss breeds, and the latter a cross again of these with the common goat or the Anglo-Nubian. Probably this last cross represents the best all-round goat in Britain, as it combines the heavy yield of the Swiss, be it Toggenburg or Saanen, with the superior quality as regards butter-fat of the Anglo-Nubian.

To the average goat-keeper who requires a good milker and cannot afford to pay a high price, the matter of breed need not be greatly considered. Nearly all the best milkers of the present

day are cross-bred animals, the result of careful selection from known milking strains.

Breeding.

The pairing season for goats is from September to January, but the earlier the service can be arranged the better, as it is desirable that the kids should arrive in February or March, so that they may have all the spring and summer before them. The period of gestation is about twenty-one weeks, or roughly, five months. She-goats that have not been served previously will come into season during January and, less frequently, in February, but, after the latter month, only very exceptionally until the following September. People who keep three goats—and this number is necessary to provide an average family with milk during the greater part of the year—should endeavour to arrange for the service of one in September or early in October, the second in November or December, and the third, if possible, in February.

Signs of the coming into season are in some cases very transient, especially in the late spring and summer. They consist in frequent bleating, a constant shaking of the tail, a turgid condition of the vulva, loss of appetite, and restlessness, and, if the goat is in milk, a temporary diminution in the milk yield. This condition will last from one to three days.

If the goat-keeper is endeavouring to improve his stock for milk production, it is essential that he should secure the services of a male bred from a good milker, or, still better, one having "milking blood" on both sides of his parentage. An alternative method would be to replace the kid or kids of the common goat by a well-bred kid of good pedigree; this may be easily done if the kid is under a fortnight old. Good pedigree kids may often be obtained comparatively cheaply by previous arrangement with the owners of well-known strains.* If neither of these courses can be adopted, it is better to kill the kids at birth and to use all the milk from the goat for domestic purposes. It seldom pays to rear male kids, and it is usually less expensive to pay even a guinea fee for the services of a good male than to rear and keep

* Before purchasing, intending goat-keepers will do well to communicate with the Secretary, British Goat Society, Coombe Bury House, Kingston Hill, Surrey, or with the Secretary, National Utility Goat Club, 31, Essex Street, Strand, London, W.C.

a stud goat; moreover, the odour and objectionable habits of the males render them anything but desirable pets.

A she-goat that has given birth to kids generally recuperates without much difficulty. If it is decided to rear the young ones they may be left with the dam for six or eight weeks and then weaned, but if the value of the milk consumed during this period is reckoned, the kids will be found in most cases to have cost more than they are worth.

Housing.

During the autumn and winter months goats are best kept on the "Soiling System"; that is, the animals are housed and all their food is brought to them. Where many goats are kept it is advisable to erect a special goat-house, or to adapt some existing building for the purpose. A simple form of house is a loose box or outhouse, bedded down with peat-moss litter. Feeding receptacles, preferably small galvanized pails, may be arranged on one side, a hay-rack on another side, and a long bench about 2 ft. wide and the same height from the ground on a third side. This bench serves as a sleeping as well as a milking bench. Goats prefer a hard bed, and especially one that is raised above the level of the floor. The objections to the loose box are that when the inmates are strangers to one another they are apt to fight, and when one is a bully she prevents her companions from getting their share of food. The goats will probably become friendly as they get accustomed to one another, but, if not, the troublesome animal should either be removed or fastened to a ring in the wall. An alternative plan to the loose box is to erect miniature stalls. Stalls occupy less space, but give more trouble, as they require cleaning out daily to keep them sweet; further, unless the stall is quite narrow— $2\frac{1}{2}$ ft. in width at the most—and the stall chain quite short and fastened to the centre in front and not at either side, the goat is likely to turn round, in which case the droppings fall into the feeding pail and get mixed with the food.

Feeding.

The goat-keeper must bear in mind three important points in feeding his stock. The first and most necessary consideration is absolute *cleanliness*, both in the food itself and in the receptacle to hold it. The best form of receptacle is a metal pail;

wooden mangers are objectionable, as the goats gnaw them and they are more difficult to keep sweet. The second point is that *variety of food* is essential; no animal tires so quickly of the same food as the goat, and it will soon give up eating if a change is not provided. The third point is one of *economy in feeding*. If a goat is fed carelessly, without due regard to its tastes or capacity, it may cost as much as its return in milk is worth; thus hay may be wasted if thrown on the ground or if placed in the manger in needlessly large quantities. In order that this fodder may not be too readily pulled out and only tit-bits consumed, it is necessary that the bars of the hay-rack should be not more than $1\frac{1}{2}$ in. apart. A still more economical plan when hay is scarce and dear is to give it only in the form of chaff mixed with oats. Oats again will be wasted if mixed with the residue of the previous meal. On the whole, bran is best given by itself, either dry or, still better, as a mash. It may be added to chopped roots or potatoes, but never to corn, since to obtain the corn more readily goats will often blow away the bran. For a change middlings or sharps may be given instead of bran with chopped vegetables.

From their kid stage goats should be encouraged to eat all vegetable waste from the kitchen, or household scraps, such as broken bread, bits of toast, boiled potatoes, oatmeal porridge, &c. In the garden there is scarcely any plant which is not acceptable. The greatest care should be taken, however, to prevent goats from eating such more or less poisonous shrubs as rhododendrons, yew, and laurels. When the supply of garden produce fails, swedes or mangolds should be purchased if they can be obtained at reasonable prices. To save trouble to the attendant, and also to keep the goat occupied, these roots are best given whole, after careful washing, but they may be chopped into "fingers" as for sheep. In the former case the goat will scoop out the "flesh," leaving the outside skin as a shell. In summer, grass may be cut and supplied instead of hay. People who live in the heart of the country can take a goat along the lanes for a walk like a dog, allowing it to nibble at the roadside as it goes along.

Tethering.

Where pasturage is available goats may be tethered out during the spring and summer. It should be remembered, however,

that this system of feeding is not likely to be successful unless it is possible to provide a frequent change of ground. If only a very limited area is available, it is usually better to keep the goats on the "soiling" system throughout the year.

There are two methods of tethering: (1) By a chain, about 3 or 4 yards long, attached to an iron pin driven into the ground, and (2) by using a length of thick, galvanized wire, or, better still, as being stronger, one composed of several strands of thin wire twisted together. This wire, which may be 20 yards or more in length, should be stretched firmly along the surface of the grass and securely pegged down at each end. The goat may then be attached to the wire by means of a short chain, one end of which is fastened to its collar and the other hooked on to the wire by means of a spring hook. The hook moves backwards and forwards with the progress of the goat, which has thus the whole 20 yards as a length of run. This method of tethering allows the goat greater freedom than is the case when a single tethering pin is used. In both cases, however, it is essential that the pin be driven close down to the level of the ground, otherwise the chain is liable to get caught on, and wound round the projecting head, thus restricting the amount of liberty allowed the animal. A cord should never be used for tethering, for when it becomes wet it twists and brings about the same result. The length of the pin will depend on the kind of soil—say, 2 ft. on light soils and 18 in. on heavy land.

It is necessary to warn the goat-keeper not to attempt tethering from the middle of October to the beginning of April. Grass in winter is much reduced in nutritive value, whilst exposure to cold winds and the elements generally, without the necessary shelter or exercise to promote circulation, often causes lung trouble and diarrhoea. It is desirable, also, that the change to grass in the spring should be gradual, as the fresh herbage is almost certain to cause bad attacks of scour, which, if neglected, may have a fatal termination.

Milking and Care of Milk.

For the first three or four days after kidding the milk is specially adapted to the young kids and is not suitable for human consumption. After that time, however, the goat can be milked twice daily, or three times if the yield approaches three quarts per day.

Milking consists in sliding the first finger and thumb along the teat and squeezing out the milk. It is an operation easily learnt, but requires some practice before the requisite facility can be acquired. In regard to milking two points should be emphasized. It should be carried out at regular intervals, and the udder completely emptied each time. The more quickly the milking is performed the better, for if lingered over the goat becomes fidgety and impatient, and is very apt to place a hoof in the pail or pan, or to upset it. An impatient animal should therefore be carefully watched towards the end of milking, and any such movement prevented as far as possible. When an animal is known to be restless, it is a good plan for the milker to have an empty jug placed beside him in which to pour the milk as the process goes on. The last drops, or "strippings," are always the richest.

All utensils must be kept scrupulously clean by scalding with boiling water and exposure for a time to the air. As milk is easily contaminated, it should not be brought into contact with any strong-smelling substance. When the milk is brought from the goat-house it should be strained through a clean butter-cloth, placed over a perforated basin, into the pan intended for its reception. It should then be stored in a cool place—a dairy for preference—till required for use.

The Yield of Milk.

An average goat will give at its flush three pints a day. A goat yielding less than one quart at that stage is hardly worth keeping. This flush of milk should last for at least three months, though the later in the season the goat kids, the greater is the tendency for this period to diminish. Thus, a goat that kids in July will seldom maintain her first yield as long as one that kids in March, whilst, should kidding take place during the rutting season—that is, in October, November, and December—the maximum period will be still shorter. The goat which has been giving three pints daily from March to June may be expected to give on an average a quart for the next three months, and if during the subsequent three she gives about one pint a day, the yield may be considered satisfactory. The total milk yield will have amounted to about sixty-seven gallons. Better milkers will

give two quarts per day for the first three months, and their total yield may be set down at from eighty to ninety gallons, whilst the best goats may sometimes yield three quarts per day.

Cost of Food compared with Value of Milk.

In estimating the cost of keeping goats to provide milk for home consumption, it is understood that they are fed by a member of the family and that no land is rented especially for them. Rent and wages may, therefore, be neglected. Opinions vary as to the cost of feeding, but it may be said that, with a paddock or good-sized kitchen garden available, the cost of keep during the six months of spring and summer should not exceed 1s. a week per goat, or, say, £1 5s. altogether. During the remainder of the year, under the "soiling" system, the goat will consume on an average each day 2 lb. of hay, costing 1d., about $\frac{1}{4}$ lb. of oats and 2 oz. of bran, which may be set down as costing another 1d., or a total of about £1 10s. During the short period that garden produce is not available roots will have to be purchased, and the cost of these would bring the total for the other six months to, say, £2. This, added to the £1 5s. previously mentioned, makes £3 5s. pér annum. Taking the yield to be sixty-seven gallons, and the price the low one of 5d. per quart, giving a value of £5 11s. 8d., it will be seen that even with an average goat a very fair profit is made. With a superior milker the profit would be considerably greater. The cost of litter—peat moss or straw—and other incidental charges, such as service of goat, &c., have not been included, as the value of the manure, no insignificant item, may be set against the former, and the value of kids against the latter. It should be carefully borne in mind that the above is only a rough estimate, and that the cost is not based on the prices quoted on the market to-day, but on those prevailing in normal times.—*From the Journal of the Board of Agriculture.*

ABORTION BACILLUS.

THE remarkable discovery of G. C. Schroeder and W. E. Cotton on the persistence of the abortion bacillus in the milk of cows, and particularly the demonstration of the fact that in one case it was eliminated from a cow's milk for four and a quarter years is a most interesting contribution to what was already known concerning the bacillus. As far as our preliminary investigations have gone in this direction, we find that the bacillus is present in the milk of cows in the herds we are using for our work, and this milk injected into healthy guinea-pigs does produce pathological lesions and death.

We collected in November last year a number of samples of milk from cows which were known to have aborted. Utmost regard was given to asepsis in order to eliminate all possibilities of extraneous contamination. Sterile tubes were filled by squirting the milk therein from some distance. With this milk guinea-pigs were inoculated intraperitoneally with quantities from 5 to 15 c.c.

Before injecting the milk was warmed to prevent shock. We find that guinea-pigs can accommodate large quantities of milk without any discomfort. Workers in this laboratory have used as high as 30 c.c. without untoward results.

The first guinea-pig died on the thirty-sixth day following the infection, the second on the forty-fifth day, and several between this later period and the fifty-sixth day. *Post-mortem* examinations of these pigs revealed the characteristic enlargement of the spleen. The lymphatic glands presented signs of degeneration. The liver was enlarged, with whitish spots throughout its substance. In some of our guinea-pigs the characteristic changes in the organs were not so pronounced as recorded by Schroeder and Cotton, but this may have been due to the cold quarters reducing the vitality of the small animals, so that they died before any great degenerative changes had taken place. Further, our organism may be of a greater virulence. In all our autopsies the clinical lesion in the spleen was taken as suggestive of infection, and it was from this organ that our cultures of abortion were obtained. Spleen pulp spread over the surface of the solid tube media gave excellent growths in reduced oxygen. The bacillus obtained in these cultures possessed more rapid-growing qualities than those obtained from material in the original host (the placenta and uterine contents).

—*Report of Veterinary Director-General, Canada.*)

Clinical Cases.

HYPERTROPHY AND DILATATION OF THE HEART.

By J. B. WOLSTENHOLME, F.R.C.V.S.

Manchester.

THE patient, a heavy cart gelding, had sustained an injury to the near hock and was sent to hospital some days later with symptoms of acute lymphangitis.

May 26, 1915, pulse 96, very weak, temperature 106° F. The symptoms gradually subsided. At the beginning of June the pulse was 42, weak. On June 16, the horse was returned for light work.

On July 19 the horse returned with the same leg much swollen, but not lame. About a week later it was noticed that laboured breathing, accompanied by sweating, would come on at intervals of one or two days and would last for two or three hours.

July 29, pulse about 72, cannot count at jaw. Temperature 101° F. Very marked jugular pulse. Eating well. Lies down. Blowing. Auscultation left chest, loud rasping sound heard, loud palpitation which sounds as a bumping against the ribs. The ordinary "lub, dup" sounds are not heard. A faint, thin wheeze is heard fairly frequently.

August 3.—Eats well, bowels normal. Cannot definitely feel pulse at elbow. It is about 80. Very marked jugular pulse. Conjunctiva rather pale, blows at intervals.

August 9.—Cannot count pulse at jaw, but is just perceptible; can with difficulty make out 66 to 72 beats at elbow.

August 12.—Pulse about 80, barely perceptible at elbow. The jugular pulse is very marked on both sides of the neck.

All the veins which are visible beneath the skin are very engorged and prominent. This is especially noticeable at the jugular and spur veins. In connection with the latter, three or more tributaries very full and prominent, may be seen joining the larger vessel.

Œdema is present beneath the breast. The general condition

of the animal is very poor; thin, with wasted muscles, although the horse eats well. Has not laid down lately. Conjunctiva pallid. Heart sounds are heard distinctly over the lower right chest. Temperature normal. Cannot feel pulse at jaw or elbow.

Auscultation left chest, over heart area a loud, irregular sound is heard, as of the heart bumping against the ribs. It is also felt by the ear and face whilst listening. The noise varies in intensity and speed, at times loud, and then low. The bumping sound is accompanied by a to-and-fro rasping sound.

The oedema beneath sternum is increased, is now the size of a small pillow. The left spur vein is very large and engorged. Four tributaries can be seen flowing into it. The right spur vein, though enlarged, does not seem quite so big as the left. The superficial veins on the inner aspect of the thighs are engorged. Conjunctiva rather pale. Eats well, has laid down once or twice.

On taking the pulse from the posterior aorta it is 72 to 80, very irregular.

August 16.—Horse killed by "Greener," and not bled.

Post mortem.—Lungs, heart, and abdominal viscera, i.e., stomach and bowels, pallid. When removing the muscles of the back they seemed to be extra dark and engorged with blood. The subcutaneous tissue in places is oedematous. About a pint of straw-coloured serum in the pericardial sac. Heart an enormous size, greatest width when collapsed $15\frac{1}{2}$ in. It is 16 in. in length from the summit of the auricles to the point of the left ventricle.

When emptied of clots, both the auricles and ventricles were collapsed and pale in colour. After being ten days in a solution of formaldehyde, and the removal of all extraneous material, the heart weighed 16 lb.

A large amount of straw-coloured, semi-transparent, gelatinous serum, which could be pulled off by the fingers, was around the root of the aorta, and the large vessels at the base of the heart. In a similar manner a small quantity of the jelly-like substance accompanied the coronary vessels.

The above case, as regards pulse, jugular pulse, and cardiac sounds, is very similar to one of some five years ago, which I kept under observation in hospital for 123 days, and finally it died from twist of the large colon and rupture of the stomach.

The heart weighed 20 lb., and an important difference was manifested: that for weeks the temperature was high, extending from 102° to 106° F.

[The normal weight of a horse's heart is about 1 per cent. of the body-weight.]

PURPURA HÆMORRHAGICA.

BY J. B. WOLSTENHOLME, F.R.C.V.S.

Manchester.

IN the experience of the writer of these notes, purpura hæmorrhagica is rarely seen as a sequel to suppurating wounds in the horse, although I am informed that such does occur in the human subject.

A six-year-old Shire gelding received a severe wound by a tread over the pyramidal process of the off hind foot. The resulting suppuration was considerable and unhealthy, the pain was severe.

Treatment adopted was antiseptic fomentations and hot boric wool poultices. The progress and condition of the wound continued to be unsatisfactory. At the end of three weeks' time purpura developed. The pulse became exceedingly weak and quick, accompanied by the characteristic swelling of all four legs, also of the face, breast, and beneath the abdomen. Purpuric spots were present on the conjunctival membranes, and large red areas appeared beneath the Schneiderian membranes, the latter was accompanied by a sanguous discharge from both nostrils.

TEMPERATURE.

First day	...	...	101·6°	...	Fifth day	...	...	105·0°
Second "	...	...	102·2°	..	Sixth "	...	...	103·6°
Third "	...	...	101·0°	..	Seventh "	...	...	102·0°
Fourth "	...	...	102·2°	...	Eighth "	...	...	normal

As might be inferred, there was an exacerbation of the symptoms on the fifth day, and the horse became very feeble.

On the seventh day there were symptoms of abdominal pain. On the eighth and ninth days the horse was so weak that he had to be raised with blocks and slings, after which he was kept in the slings, loosely applied, until he left hospital three weeks later in fair health and fairly lively.

HÆMORRHAGE FROM THE BOWEL IN THE DOG.

By G. MAVALL, M.R.C.V.S.

A FOX terrier was brought into the infirmary in March with the history that he was passing teaspoonfuls of blood in his motions. He was kept under observation and the statement was verified. The dog seemed slightly depressed, membranes pale, temperature and pulse not much disturbed. The blood passed was of a venous character.

I considered what was to be done and was rather puzzled as to what therapy to apply. Exploration per rectum gave no indication as to anything wrong with this organ as far as it could be felt. It seemed evident that the bleeding was from a vessel beyond reach and not to be remedied by local applications directly applied. The thought then struck me that I had some "tabloids" of lodal by me that had been successfully used on the recommendation of a veterinary surgeon for uterine haemorrhage in a bitch some time previously. I resolved to try them on this case. "Tabloids" of 1 gr. of lodal (Burroughs Wellcome) were given night and morning, and although the blood was present for a week in varying but lessened quantities, and there was some diarrhoea, yet gradually recovery took place with the medicine indicated and a diet of arrowroot biscuits and milk in small quantities. "Lodal" is an oxidation product of laudanosine, which is an alkaloid obtained from opium. It causes a rise in blood-pressure due to slight vaso-constriction and increased cardiac output. It is particularly and almost solely recommended to allay uterine haemorrhage. In this case it did good in a bowel case, but it must be recollect that here the patient was a dog and not a bitch. The dose given was the human one.

The cause and origin of the haemorrhage were obscure, but nothing was passed in the motions to indicate that it was due to a foreign body and nothing could be detected externally by palpation.

VAGINITIS, URETHRITIS AND RETENTION OF URINE
IN THE COW.

BY G. MAYALL, M.R.C.V.S.

CALLED in February to a recently bought cross-bred, red and white horned cow that had picked her calf at about the seventh month of pregnancy. Was told that she was constantly straining, only passed urine in driblets, and had not had a free stream for several days. On examining the vagina found it spotted and inflamed, the tumefied and corded urethra could be felt through the floor of the vagina, and the bladder was greatly distended. There was no vaginal discharge. Passed the catheter, when about 2 quarts of bad-smelling, high-coloured urine was voided, the cow straining intermittently all the time. There was no pus, flocculi, or sediment in the urine. The dung was lumpy and passed in jerks during the catheterization. Injected the vagina well for five minutes with mercuric iodide solution 1 in 5,000. Afterwards inserted one of Burroughs Wellcome and Co.'s corrosive sublimate bougies gr. 1/25. Left a bottle of medicine containing liquor hamamelidis 2 oz., pot. bicarb. 2 oz., sodæ hyposulph. 1 oz., water to 12 oz. To be well shaken and a fourth part given night and morning in a pint of linseed tea.

Next day cow much better, no straining, vagina a more healthy colour. Syringed again with mercuric iodide solution and inserted another pessary or bougie. Left two pessaries to be inserted by the owner. This cow went on wonderfully well and needed no further attention.

The Burroughs Wellcome bougies are the handiest I have yet used. They are smaller than those usually made, not being much thicker in calibre than an ordinary lead pencil, consequently they are suitable for any of our patients. They melt quickly and are apparently quite effective. They are handy to insert. Mercuric iodide solutions (made from tabloids so that the strength can be regulated) I have found to be far and away the most reliable injections in vaginal and uterine affections in all animals. In cases of metritis and vaginitis in the mare and cow I have found them exceedingly valuable.

Laboratory Notes.

A CASE OF CONTAGIOUS BRONCHO-PNEUMONIA CAUSED BY *BACILLUS COLI COMMUNIS*.^[1]

BY EDWIN M. STANTON.

Detroit, Mich.

HUTYRA and Marek [2] state that enzootic pneumonia of young animals is caused by the *Bacillus bipolaris septicus* or its varieties. However, cases are on record where the disease has been due to an infection with the *Bacillus pyogenes*, the *Streptococcus pyogenes*, and by the bacteria of the colon group. It is further stated that in other enzootic diseases, as white scour and dysentery of sucklings, contagious broncho-pneumonia occurs as a secondary infection. E. Wallis Hoare [3] says that broncho-pneumonia is caused by a variety of organisms; the bipolaris being the most common. He states that the *Bacillus coli communis* produces broncho-pneumonia as a secondary infection of white scour, and in the chapter upon white scour [4] it is stated the lung affection follows as a complication.

The statements of these two authors are exceedingly interesting. They show that it is possible for animals affected with a contagious intestinal disease to infect other animals with the organisms causing that intestinal disease, and that the latter animals may manifest entirely different symptom complex than that which existed in the animals primarily infected. The disease produced in the secondarily infected animals may involve a different anatomical system. In this way a secondary disease of a highly contagious nature is introduced into a herd. In other words, we have an organism such as *Bacterium coli communis*, that is capable of producing in the animal economy two highly contagious diseases of a different nature.

During November of 1913 a section of lung was sent to this laboratory by the late Doctor Frederick H. Osgood, of Boston, Mass., with the request that a diagnosis be made. The history accompanying the specimen stated that the specimen was from a six months old calf, which had died, exhibiting symptoms before death of a disease which had affected forty other calves upon the premises, resulting in the death of these animals.

The symptoms as stated were as follows: Elevation of temperature, discharge from the mucous membranes of the eyes and nostrils, loss of appetite, emaciation and respiratory disturbances, and death. It was stated that the disease occurred after the introduction into the herd of some thoroughbred Jerseys.

Gross Pathology.—The surface of the lung tissue was greenish in colour, roughened and covered with round and oval nodules about the size of a small pea. The nodules were soft, and when pressed a thick, creamy pus exuded. Upon cutting into the tissue the cut surface was of a dark red colour. From the section of tissue pus exuded. The tissue was heavier than water and non-crepitant.

Bacteriological Examination.—Smears from the pus were made, and when stained revealed a few streptococci and numerous short bacilli.

Agar plates were made from the pus in the usual way. One set was incubated aerobically, the other anaerobically. After twenty-four hours' incubation both series of plates contained many colonies of bacilli. No colonies of streptococci nor staphylococci were observed on either set of plates.

Subcultures were made upon plain agar slants and incubated eighteen hours. Microscopical examination showed that the cultures consisted of a short bacillus. The organism was then transferred to differential media consisting of agar slant, plain agar deep, glucose agar deep, plain bouillon, plain and litmus milk, gelatine, potato and fermentation tubes of glucose, lactose and saccharose.

DESCRIPTION OF ORGANISM.

Morphological Characteristics.—A short, plump motile rod, which is Gram negative, and does not form spores.

Cultural Characteristics.—Plain agar, a translucent, raised, moist growth with wavy margins.

Deep Agar.—Translucent, confluent colonies along line of stab, and on the surface above the entrance of stab the growth raised and slightly greyish. A few gas bubbles observed in the body of the medium.

Glucose Agar Deep.—The growth the same as in agar deep. Medium, broken by gas formation.

Plain Bouillon.—Cloudy, viscid sediment formed at the bottom. A faecal odour was noticeable.

Plain Milk.—Coagulated, not digested. *Litmus Milk.*—Acid, coagulated. *Gelatine.*—Not liquified. Confluent colonies along line of puncture.

Potato.—Greyish white, glistening growth. *Glucose Bouillon.*—5 c.c. of gas, acid. *Lactose Bouillon.*—1 c.c. of gas, acid. *Saccharose Bouillon.*—3 c.c. of gas, faintly acid. *Durham's Peptone Solution.*—Indol formed.

From the cultural and morphological characters, the organism was identified as *Bacillus coli communis*.

From the pathological condition of the section of lung sent in, it was evident that a pneumonic condition existed. The symptoms stated pointed to a broncho-pneumonia, and from the bacteriological findings it appeared that the *B. coli communis* was the causative agent.

REFERENCES.

- [1] Research Laboratory, Parke, Davis and Co., from collected papers.
- [2] HUTYRA and MAREK: "Pathology and Therapeutics of the Diseases of Domestic Animals," vol. ii, pp. 134-135.
- [3] E. WALLIS HOARE: "A System of Veterinary Medicine," vol. i, p. 496.
- [4] *Ibid.*, p. 504

SCURVY AMONGST YOUNG PIGS.

By J. B. CLELAND, M.D., Ch. M.

IN September, 1911, some young pigs died unexpectedly at the Experiment Station on Milson Island. Three of them died on one day, and one on the next, and two others became acutely ill. The two sick pigs showed a great disinclination to move in any way. Their hair was rough and unkempt. One of them showed considerable swelling of the right hind and left forefeet, the swelling being most marked over the metacarpal and metatarsal regions. The animal seemed to suffer a good deal of pain. It was killed, and a *post-mortem* examination held to ascertain the nature of the condition.

The lung showed a few small petechial patches under the serous coat; there was no pneumonic consolidation. There were one or two narrow darker areas, probably the result of previous consolidation or collapse. The heart, liver, and spleen appeared to be normal. The peritoneal cavity showed no excess of fluid. The small intestines for a great part of their extent were congested; and the solitary follicles of the large intestine were prominent, but there was no ulceration. The mesenteric glands showed slight areas of blood extravasation towards their periphery. There was slight extravasation of blood in the right groin, and the inguinal glands of the right side were a little enlarged.

The swollen area of the right hind leg proved to be a haemorrhagic exudation under the periosteum of the metatarsal bones and into the medulla. The periosteum stripped easily, leaving the bone bare.

In the case of the left foreleg a very similar condition was present, save that the medulla was more affected than the periosteum.

The appearances presented suggested the possibility of scurvy, and a consideration of the food the animals had been receiving seemed to indicate a lack of fresh food. This diagnosis was supported by the fact that cultures from the lesions were sterile, and inoculations into other pigs with material failed to give any result. An alteration in diet, so as to give the animals more fresh food, quickly resulted in the cure of the remaining pig, and in the prevention of any fresh cases.—*Report Government Bureau Microbiology, New South Wales.*

Abstract.

AVIAN TUBERCULOSIS.

By C. H. HIGGINS AND A. B. WICKWARE.

Biological Laboratory.

THE disease known under the synonyms, consumption, tuberculosis, and the great white plague (the latter applying more specifically to the affection as found in human beings) is of such widespread importance as to warrant careful consideration, whether appearing in men or animals.

In preparing an article dealing exclusively with this malady as observed in fowls and birds in general, no presumption is made of bringing to light new disclosures, but rather an endeavour will be made to deal with the affection in a general way, from a pathological as well as economic standpoint, and also to record such of our experiments as have a practical bearing on the prevention and eradication of this disease.

It is only within comparatively recent times, slightly over a decade, that tuberculosis as a disease has been observed among fowls in Canada. The affection had probably existed for many years, but its true nature and significance was not recognized until diseases of poultry commenced to attract the attention of workers in comparative pathology. Even up to the present time, the importance of the conservation of domestic fowls is scarcely realized, and apart from the purely technical considerations of the diseases which they may contract, very little thought has been exercised as to how the fostering of the industry will affect our domestic economy.

The losses from tuberculosis have been large to poultry owners, but there is at present no means of arriving, even approximately, at an accurate estimate. Theoretically, poultry offer one of the best investments for capital, but the losses are so great that the theoretical estimate must be discarded. Once tuberculosis disease makes its appearance in a flock, the aggregate losses are large, although a great number of birds do not usually die at one time. The general unthriftiness of the fowls, however, renders them unsuitable for table use, and the non-production of eggs makes the industry very unprofitable as well as discouraging to the poultry owner.

As avian or fowl tuberculosis, viewed from a causative standpoint, is almost identical with the disease as found in human beings and bovines, it is imperative that further research work be conducted in order to establish, if possible, its exact relation as a source of infection for other animals and man.

The matter is more pertinent since Mohler and Washburn, of the United States Bureau of Animal Industry, have reported the transmission of avian tuberculosis to mammals by the direct feeding of diseased organs, and also the infection of guinea-pigs by artificial inoculation with the whites of eggs from affected fowls.

That there is considerable variation in the morphology of the causative organisms found in the different forms of tuberculosis cannot be disputed, but extensive investigations have shown that even these apparently specific characteristics can be altered by artificial cultivation upon various laboratory media and also by growth in the tissues of different animals.

The fact that avian tuberculosis is transmissible to mammals, and the mammalian type communicable to human beings, serves to substantiate the theory that changes may occur in the human host whereby the avian and bovine types of organism may undergo transformation into the human type.

Recent statistics show that the bovine type of organism was present in 90 per cent. of cases of cervical adenitis (enlarged glands of the neck) occurring in children in the vicinity of Edinburgh, infection probably arising through the consumption of non-pasteurized milk. As these and many other cases of human tuberculosis have been traced to infection through the medium of raw milk, it is only natural that one should question the possibility of transmission of this insidious disease through the medium of raw eggs. This assumption does not seem unreasonable in view of the fact that raw eggs form the principal article of diet for invalids and individuals whose natural resistance may be lowered, and whose systems are impoverished from any one of a number of causes.

Himmelberger, of the Michigan Agricultural College, has recently succeeded in transmitting avian tuberculosis to a bovine, in which latter he obtained a reaction with avian tuberculin, although unable to elicit a response when using the bovine tuberculin.

During investigations conducted at this laboratory throughout

the past two years, our attention has been chiefly directed towards the microscopic detection of tubercle bacilli in eggs, the infection of experimental animals with these eggs, and the perfecting of a method of diagnosis whereby latent and incipient cases could be identified.

The possibility of congenital tuberculosis being present in chicks has been given considerable attention, but our experiments in this connection have thus far given only negative results. Eggs from tuberculous fowls have been artificially incubated and the chicks immediately transferred to new quarters, where special precautions were taken to prevent infection from outside sources. The most careful autopsies, however, failed to reveal lesions of tuberculosis, while cultures from splenic tissues gave negative results.

The demonstration of acid-fast* organisms in eggs was also undertaken, and in nearly 20 per cent. of the latter, bacilli microscopically indistinguishable from tubercle were found to be present. The subsequent inoculation of guinea-pigs with material from these eggs produced a generalized tuberculous infection, from which typical avian cultures were procured.

SYMPTOMS OF THE DISEASE.

The causative organism or germ of tuberculosis gains entrance to the system, usually with the food, and finding a favourable location grows and extends to the various tissues. This growth of the germ induces symptoms of unthriftiness, and this unthriftiness is followed sooner or later by death. The detection of tuberculosis from the symptoms is not always easy. Some may be observed to be "going light," yet they are seen to be good feeders. If picked up it is found that the flesh has almost entirely disappeared from the breast-bone, and this should make one suspicious that something is wrong. A yellow or greenish diarrhoea is frequently present in affected birds, and where this is present the type of the disease is most dangerous to the remainder of the flock, as the germs are to be found in the droppings in immense numbers.

One of the most frequent symptoms seen early in the course

* Tubercle bacilli from any source possess the peculiarity of retaining the dye material used for their study in the presence of acid, hence the term acid-fast.

of the disease is lameness, a result of the infection involving a joint of the leg. Lameness is mentioned by persons forwarding fowls for diagnosis more frequently than any other symptom where our subsequent examinations have proven the trouble to be due to tuberculosis. So frequently is lameness the principal symptom observed that we are at once suspicious of tuberculosis whenever the symptom is mentioned.

COURSE OF THE DISEASE.

Fowl affected with tuberculosis may die in a few days from the first appearance of symptoms, or they may linger for weeks, gradually becoming more emaciated as the disease progresses, until they die from exhaustion. The progress is largely dependent on the strength of the invading germ and the natural resistance of the bird. Some outbreaks of the disease follow a more rapid course than others; usually, however, the course in an individual extends over weeks, and sometimes months may intervene before death takes place.

POST-MORTEM FINDINGS.

The *post-mortem* findings in fowl tuberculosis, when considered in relation to the symptoms and general history, are characteristic. The liver is usually the principal organ affected, and there are lesions from the size of a pin point to that of a large pea, which are white or yellow in colour. The larger lesions when cut into give a gritty sensation as the knife passes through them. These lesions are distinct from the liver tissues, and may be quite easily separated from the liver itself. In the more acute cases the liver may be greatly enlarged, even to twice its normal size. This enlargement in chronic cases is noticeable. The spleen is usually involved, the lesions having the same characters as mentioned for those in the liver. The enlargement of the spleen is usual, and it may be four times its normal size. The intestines may or may not be involved. When lesions are present we find nodules from the size of a small pea to that of a medium-sized nut. The minute dissection of these usually presents a free opening into the inside of the bowel, and at this point of entrance there is an ulceration. It is through this opening from the nodule on the intestine to the interior of the bowel that the bacilli gain access to and are so easily distributed by the droppings.

Other visceral organs are seldom involved. It is frequently observed that the joints, notably that of either or both hips, may be the seat of tubercular ulcerations. Such an ulceration is the cause of lameness during life.

PREVENTION AND TREATMENT.

In the prevention of tuberculosis and other infectious diseases of fowl, sanitary surroundings, with plenty of sunlight and fresh air are requisites of prime importance. In our opinion these features are best obtained by the use of the modern cotton-front house, a number of types having been described by various poultry authorities. Circular No. 7, prepared by the late Professor A. G. Gilbert, of the Experimental Farm Staff, describes in detail the method of construction and may be obtained on application.

The best means of preventing and treating tuberculosis in fowls is to destroy the entire flock if all have been running together, and to thoroughly cleanse and disinfect the quarters which they have occupied with any good disinfectant, one of which is a 5 per cent. solution of crude carbolic acid. This may be made by adding two teacupfuls of crude carbolic acid to a pail of hot lime wash. This should be applied with a spray pump, brush, or old broom to all parts of the house occupied by the fowl. This method of disinfection is suggested, owing to the fact that in tuberculosis or consumption in fowls, as has already been indicated, the bacilli or germs are found in the droppings in great numbers, and these should be destroyed. This action is further recommended, as it has been shown that fowls, dead of tuberculosis, if eaten by hogs, communicate the disease to them, and it is probable that the droppings would also communicate the disease in a similar manner.

When destroying the birds after it has been demonstrated that tuberculosis is present, some may be suitable for food if an examination of the livers shows no yellow or white spots from the size of a pin point to that of a pea, and there are no nodules or lumps on the intestines. When these lesions are present the flesh cannot be considered suitable for human food.

We have found that eggs from tuberculous fowls may contain the bacilli or germs in the white, and we, as well as others, have demonstrated that they are in sufficient numbers to infect small experimental animals.

This suggests a possible source through which tuberculosis may be introduced into a flock, namely, by the unsuspecting purchase of eggs from someone who has tuberculosis among his fowl.

The drastic measures above recommended should be followed in all cases when tuberculosis appears among fowl. These measures, while temporarily entailing a considerable loss, will in the end prove the most economical to the owner and the community.—*From Report of Veterinary Director-General, Canada.*

ARMY VETERINARY SERVICE.

REGULAR FORCES. ARMY VETERINARY CORPS.

TEMPORARY LIEUTENANT H. G. BOWES to be temporary Captain whilst holding a special appointment.

Temporary Lieutenants to be temporary Captains: L. Littler, W. S. Thompson, S. E. Robson, R. N. M. Williams, R. J. Hall, G. W. Roberts, T. C. Howatson.

To be temporary Lieutenant: P. S. Howard, F.R.C.V.S.

Temporary Lieutenant C. W. Baker relinquishes commission on termination of his engagement.

To be temporary Lieutenants: A. E. Willett, K. Barker, F. D. Neal.

Captains to be temporary Majors whilst holding appointment of Assistant Director of Veterinary Services of a Division: T. Bone, R. Tindle.

Temporary Lieutenants to be temporary Captains: B. M. R. West, F. M. Coombs, A. E. Roberts, A. V. Meekie, P. Braid, W. Barr, K. A. Roberts, W. S. Stevens.

The Christian names of Temporary Lieutenant Frederick Lawrence Clunes are as now described, and not as in *Gazette* of March 25, 1915.

Major W. B. Edwards to be Temporary Lieutenant-Colonel whilst holding the appointment of Assistant Director of Veterinary Services, Cavalry Corps.

Temporary Lieutenants to be temporary Captains: G. S. Thornewill, R. W. MacDonald, A. R. Younie, J. Buie, G. P. Hayter, A. E. Bailey.

To be temporary Lieutenant: R. S. Pethick.

Temporary Lieutenant to be temporary Captain: W. H. Blanchard.

Temporary Lieutenant T. V. Simpson relinquishes his commission on termination of engagement.

To be temporary Lieutenant: B. McMahon.

The dates of promotion of the following Lieutenants to be Captains are as now stated, and not as in *Gazette* of February 1: P. S. Sparling (September 19), R. Chown (September 22).

To be temporary Lieutenant: J. Lawther.

Temporary Lieutenant to be temporary Captain: T. B. Bindloss.

To be temporary Lieutenant: S. E. Boulter.

Temporary Lieutenant R. Colthurst relinquishes his commission.

To be temporary Lieutenants: S. L. Wall, H. V. Fenn.

Temporary Lieutenants to be temporary Captains: H. A. Trudel, H. Chagnon, J. W. Bennett, W. B. Howe.

To be temporary Lieutenant: G. Currey.

Captains to be temporary Majors whilst holding appointment of Assistant Director of Veterinary Services of a Division: R. W. Mellard, H. C. Stewart.

Captains to be temporary Majors: G. W. Godwin, whilst commanding a Veterinary Hospital; W. I. Macaulay, whilst Assistant Director of Veterinary Services of a Division.

Temporary Lieutenant to be temporary Captain: F. L. Clunes.
 Temporary Lieutenant H. Walpole relinquishes his commission on termination of his engagement.

To be temporary Lieutenant: J. R. Rigby.

Temporary Lieutenant to be temporary Captain: H. W. Percy.

TERRITORIAL FORCE. ARMY VETERINARY CORPS.

Captain to be temporary Major: P. J. Simpson.

Lieutenant E. Child relinquishes commission on account of ill-health.

Lieutenants to be Captains: D. Weir, Temporary Captain R. E. Beilby, D. R. Chatterley, and to remain seconded, Temporary Captain M. T. Sadler, J. H. Thompson, J. Blakeway, A. G. Saunders, Temporary Captain J. C. S. Powell, R. M. Aulton, L. W. Wynn Lloyd, Temporary Captain C. R. Chadwick, A. C. Duncan, F.R.C.V.S., W. S. Lornie, A. F. Castle, F.R.C.V.S., P. R. O. Thrale, E. S. Martin, J. G. McGregor, F. E. Heath, W. D. Jordan, J. H. Wright, F. W. C. Drinkwater, W. D. Williams, Temporary Captain P. S. Morgan, C. W. Cartwright, T. Thomson, R. W. Williams, J. H. Jones, R. H. Over, E. Berry, V. P. Jones, G. E. Henson, J. Y. Bogue, V. A. Bartrum, R. B. Palmer, J. R. McCall, D. R. Crabb, T. Bagshaw, Temporary Captain A. J. Hines, T. A. B. Cocksedge, F. J. Moon, A. Robb (jun.), W. G. Thomson, Temporary Captain A. R. Routledge, J. A. Shaw, G. W. Bloxsome, H. H. Lord, F. B. Ditmas, J. Facer, W. Aitkin, P. S. Thierry, A. H. Adams, J. R. Crane, J. Sheffield, Temporary Captain F. Hopkin, H. C. Taylor, D. H. Rylands, J. A. G. Gosling, J. Southall, C. Taylor, L. A. F. Dawson, H. Sumner, H. McD. Paul, W. T. Olver, A. J. Beckett, J. C. Gaunt, J. Cameron, R. J. Sargent, C. W. Townsend, R. L. Armour, H. Newton, B. J. Rees, A. Mackenzie, B. H. Benson, F. B. Greer, G. G. Sooby, G. M. Vincent, W. F. Wilson, R. Bryden, A. S. Chisholm, R. C. Matthews, A. H. Watson, J. Cunningham, C. Holland, W. H. Townson, E. E. C. MacLachlan, J. W. H. D. Sarjeant, J. Donaldson, J. F. Player, T. S. Green, W. F. Garside, H. D. Sparrow, J. F. Taylor, A. H. Leyland, J. C. Storie, W. J. Sheffield, F. Bradley, J. G. Deans, J. M. McMaster, R. W. Clarke, J. A. Craft, W. H. Brown, R. Simpson, T. Craig, E. J. Laine, J. R. Green, S. G. Howard, Temporary Captain J. Bell, G. O. Ogden, E. R. H. Woodcock, F. J. Richmond, G. C. Robertson, V. S. M. Cope, W. P. S. Edwards, H. A. Thorne, W. G. Darling, J. Daly, D. Keir, G. Atkinson, R. A. Edwards, J. Spruell, J. Martin, C. E. Y. Bryan, J. P. Heath, E. F. Angler, A. C. Burton.

Captain D. R. C. Tennant to be Assistant Director of Veterinary Services and granted temporary rank of Major whilst so employed.

TERRITORIAL FORCE. ARMY VETERINARY CORPS.

The dates of promotion of the following Captains are as stated against their names, and not as announced in *Gazette* of February 26: G. W. Bloxsome (August 5); H. H. Lord (August 6); F. B. Ditmas (August 7); J. Facer, W. Aitkin (August 8); P. S. Thierry

(August 9); A. H. Adams, J. R. Crane (August 19); J. Sheffield, F. Hopkin, H. C. Taylor (August 20); D. H. Rylands, J. A. G. Gosling, J. Southall (August 22); C. Taylor (August 25); L. A. F. Dawson (August 26); H. Sumner, H. McD. Paul (August 29); W. T. Olver (August 30); A. J. Beckett (August 31); J. C. Gaunt (September 1); J. Cameron (September 3); R. J. Sargent, C. W. Townsend, R. L. Armour, H. Newton, B. J. Rees, A. Mackenzie (September 5); B. H. Benson (September 6); F. B. Greer (September 9); G. G. Sooby, G. M. Vincent, W. F. Wilson (September 12); R. Bryden (September 14); A. S. Chisholm, R. C. Matthews (September 19); A. H. Watson (September 22); J. Cunningham, C. Holland (September 23); W. K. Townson (September 25); E. E. C. MacLachlan, J. W. H. D. Sarjeant (September 30); J. Donaldson, J. F. Player (October 1); T. S. Green (October 2); W. F. Garside (October 3); H. D. Sparrow (October 5); J. F. Taylor (October 7); A. H. Leyland, J. C. Stoile, W. L. Sheffield (October 10); F. Bradley (October 17); J. G. Deans (October 18); J. M. McMaster (October 24); R. W. Clarke (October 27); J. A. Craft (October 29); W. H. Brown (November 1); R. Simpson, T. Craig (November 6); E. J. Laine (November 12); J. R. Green (November 15); S. G. Howard (November 19); J. Bell (November 21); G. O. Ogden (November 27); E. R. H. Woodcock (November 28); F. J. Richmond (November 30); G. C. Robertson, V. S. M. Cope (December 23); W. P. S. Edwards (January 1); H. A. Thorne (January 2); W. G. Darling (January 5); J. Daly (January 13); D. Keir, G. Atkinson (January 20); R. A. Edwards (January 22); J. Spruell (February 2); J. Martin (February 10); C. E. W. Bryan (February 11); J. P. Heath, E. F. Angler (February 13); A. C. Burton (February 27).

Lieutenant W. Wordley is removed from the Territorial Force for absence without leave.

Captain D. Hamilton relinquishes his commission on account of ill-health; Captain J. C. Coleman resigns commission.

Captain A. Spreull to be Assistant Director of Veterinary Services, and granted temporary rank of Major whilst holding the appointment.

The President of the French Republic has bestowed the "Medaille Militaire" on the following, in recognition of distinguished service during the campaign:—

Staff-Sergeant (temporary Sergeant-Major) A. J. Warburton, 72.

Captain S. J. Williams to be Assistant Director of Veterinary Services, and granted temporary rank of Major whilst so employed.

Captain J. E. L. Still to be Assistant Director of Veterinary Services, and granted temporary rank of Major whilst so employed.

SPECIAL RESERVE OF OFFICERS.

Lieutenants (on probation) confirmed in rank: C. P. Fisher, G. Lloyd, C. R. Roche, F. J. Shearman, E. J. Mulligan, R. H. Stalker.

THE
VETERINARY JOURNAL

MAY, 1916.

Editorial.

BEYOND THE PALE OF CIVILIZATION.

WHEN a boy at a public school becomes very unbearable or objectionable to his fellows he is relegated to what is known as "Coventry." He is looked on, until he reforms, as an unworthy member of the general body, and by abstaining from intercourse and conversation with him, it is sought to punish and bring home to him the outrageousness or dishonourableness of his conduct. Where men gather together in clubs there is a recognized standard of behaviour and demeanour among them. Members who transgress the rules and do not play the game are black-listed or expelled from the club. There is a standard of ethics erected on a higher plane for professional men. Not only are they directed to act honourably towards each other, but they must also use all skill and diligence in prosecuting the calling which they follow. Certain broad yet well-understood rules must govern their actions and procedure, and, in the case of the medical profession, the claim to be attentive, scientific, and humane in dealing with patients and ailing humanity is one which of all considerations is the most self-evident, vital, and important.

Animals often turn on their weaker, injured, and ailing mates and rend and attack them. Savages and barbarians destroy their hindering or aged units. Cannibals kill and eat their prisoners. The laws and usages of civilized life do not appeal to them. The customs and procedure of nations that have progressed along the road of enlightenment, humanitarianism, and refinement are not understood by them, and to preach the doctrines of civilization to them, unsupported by force to back them up, is only to become a prey to their primitive instincts and to be destroyed by them. The only argument they understand is the persuasion of the man with the club, the spear, or the gun. They are beyond the

pale of civilization. Yet even many of the races that we term savage have a code of conduct which seeks to assuage the sufferings of the sick and injured through the ministrations of the medicine man. However ignorant and intellectually dark they may be, they do their best according to their lights to soften the way or delay the departure of their failing ones to the happy hunting ground.

Ruthlessness is the essence of war. The rules of warfare being observed in the fight, it is the duty of the contending parties to use all effort to destroy each other or render each other's aims and objects nugatory or of no avail. The clean-minded and fair-fighting warrior treats with a due amount of mercy and chivalry those whom he has captured, beaten, battered, or bruised.

The silver lining to the horror cloud of war has always been the never-failing kindly activity of the members of the medical and nursing professions. They have risen nobly to the great strain that has been put upon them. The Army Veterinary Corps follows in their footsteps. Absolute self-sacrifice and the surrendering of life itself in the service of humanity have been exemplified over and over again by the healers in this and other struggles between Western nations. The rules of the game of war have been kept well by the majority of the parties to the conflict, but the referees in the shape of the neutral nations have not been strong-handed enough.

Having written so much, we have now to dwell on the actions of a representative of a so-called civilized nation who has lately been guilty of almost inconceivable cruelty and heartlessness—conduct which in this case surely puts him beyond the pale of civilization, and in some respects reduces him below the level of the untutored savage.

Whilst the German Chancellor talks about his country going to war for the protection and unity of his countrymen, offers a German millennium to small nations, and poses as the friend of the oppressed and the enemy of the oppressor, what do we find happening at Wittenberg, a short distance away from Berlin?

Here there were confined 15,000 prisoners in a camp, the British numbering 700 to 800. Typhus broke out among them. Thereupon the German military and medical staff precipitately left the camp, and from December, 1914, to August, 1915, no communications were held between the prisoners and their

guards, except by means of directions shouted out by the guards or officers from outside the wire entanglements of the camp. No medical attention during the whole time was provided by the German staff. Food was sent into the camp by trolleys worked by winches; supplies were sent down on chutes. Infection was encouraged rather than hindered, each mattress had to be shared by three prisoners, infected mattresses were left or sent back to spread infection, typhus cases were transported on the tables from which the men ate their food. Soap was barred, medical supplies easily obtainable were not granted, and lice and filth covered the poor victims. Six English officers of the R.A.M.C. were sent to the camp at the outbreak of the epidemic, and on February 11, 1915, two of these were taken away to serve elsewhere. Of the four remaining only Captain Lauder survives. Major Priestley, one of the officers taken away, vouches for many inhumanities that he actually saw when he returned to the camp on March 7.

The now notorious Dr. Aschenbach, the German medical chief at the camp, only visited the place once during the course of the epidemic, and for his part (a coward's one) in combating the outbreak he received that besmirched symbol known as the Iron Cross. Terrorizing the prisoners with savage dogs, controlling them with loaded rifles, flogging them with rubber whips, and tying them to posts are among the facts recorded in the report by Mr. Justice Younger, Chairman of the Government Committee on the Treatment by the Enemy of British Prisoners of War.

Now to revert to our opening remarks and point the moral. Do we wish to have the names of the countrymen and allies of Dr. Aschenbach still enrolled and retained in the list of honorary and foreign associates of our profession? Until his name has been expunged for all time from the German *Medical Register*, the Iron Cross replaced by stripes on his back, and a long sojourn in a prison cell given to him, we can hardly consider his fellow-practitioners who do not protest against his villainous conduct as being much less guilty than he himself. We are better unassociated, even in the pages of a Register, with men who stand by unmoved whilst one of their fraternity is presented with an Iron Cross by a misguided Emperor for vile, inhuman, and criminal conduct. We commend these views to the consideration of our colleagues and Council.

G. M.

Original Communications.

A HYDROCEPHALOUS MONSTER (FOAL), WITH A FEW REMARKS ON PARTURITION IN THE MARE.

By FRED. C. MAHON, M.R.C.V.S.

Southampton.

I wish as briefly as is possible in considering so wide and diversified a subject as parturition, particularly difficult presentations, to describe a rather rare, if not unique case, which came under notice in May, 1912, whilst managing a practice in Sussex. To country practitioners especially do these cases fall in numbers; it is rarely town practitioners have these conditions to combat. In all animals monstrosities occur. I have personally encountered them in mares, cows, sheep, bitches, cats, but only once in a goat. They are good subjects from a photographic point of view. In delivery they often try the best skill, exhaust the physical powers of the giant, and tax the mental capacity of the most experienced.

To encounter them in the young animal about to become a mother is bad enough, but in an ill-conditioned animal, aged eighteen years, who had not conceived hitherto, was my experience. The owner's condition negatived assistance of any value, and the labour fell upon me when in ill-health and at the fall of a long day's work. Unprepared, with no surgical instruments at hand, I fell back upon two pieces of cotton rope, worked assiduously for one and a half hour, and was rewarded by a monstrosity which fairly staggered the owner and myself.

Briefly, I may add the mare had been in labour for some hours prior to my visit to the farm and had been pulled about severely. She was distressed, was groaning, covered also with perspiration, and fell to the ground more than once during the preliminary examination to ascertain the position *in utero* of the foal. I took several minutes, once the mare regained the upright position, to convince myself that the foal was dead, and, further, that I had a malformed skull to contend with.

The diseased condition (pathological anatomy, hydrocephalus) is recognized by a more or less exaggerated development or volume of the cranium, the vault of which has been

elevated by fluid collected in the brain ventricles. It is noted that the distension in some cases has been so slight that the frontal bones are not much raised, whilst in others the collection of fluid has been so great that these and other bones of the cranium are displaced, and the forehead, rising almost at right angles to the face, suddenly reaches an extraordinary height, giving the creature a startling appearance. The hydrocephalous tumour varies in shape as well as in volume. It is sometimes, as was in the case to be described later, quite globular, and protruded so high and so much over the face as to give the physiognomy a strangely human appearance. The sketch I append is a crude one, as I am lacking, unfortunately, in artistic finesse, but I hope it may give my readers some idea of the monstrosity in question.

In rare cases of hydrocephalous monstrosities the skull is narrow but excessively protuberant, involving only a portion of the cranium, at other times it is bilobular, and the divisions may be either alike or unequal in volume.

THE ANTERIOR PRESENTATION; DORSO-SACRAL POSITION.

Downward deviation of the head was encountered in my case, left leg protruding as far as the middle of metacarpal bone *per vaginam*. The right limb downwards, backwards, and could not for half an hour be reached. The cranium pressed against the brim of the pelvis, leaving the dome-shaped head only within reach.

The dorso-sacral position is frequently met with in my experience among the heavier breeds. It is also usually met with in "hydrocephalus," though it is not very uncommon when the cranium is normal and the foetus well formed. It is usually encountered in the dorso-sacral position, though not infrequent in the "dorso-pubic." It perhaps occurs oftenest in the cow.

The cause is usually ascribed to *post-partum* rupture of the foetal membranes, as the uterine contractions force the foetus backwards, and the head is pushed lower and under the neck until it gets beneath the chest, and even abdomen, where it may deviate to one side. The fore limbs are, of course, situated in the genital canal.

The accident is discovered by manual exploration, the fore limbs being followed by the hand; the crest of the neck is found

pressed against the pubis, while the head can be traced by the ears and the orbits, the face being towards the floor of the uterus, or the hand may discover the nose and mouth inclined upwards at one side of the chest behind the elbow. In this condition birth is impossible, as straining and traction only make matters worse.

INDICATIONS.

When the upper part of the neck alone presents, reduction is still possible, provided no great delay has occurred, no mismanagement by unskilful people has been allowed.

But when the waters have long been expelled, the legs pulled out by amateurs, and the uterus closely applied to the body of the foetus, the case is most difficult, and then manipulation and retrorpulsion cannot effect much in many instances. The double neck, as it were, is too voluminous to enter the pelvis, and the longer the pains continue the farther is the head pushed forward from the inlet, therefore away from the reach of the obstetrist. The contractions of the closely applied uterus also render attempts at delivery almost impossible by their paralysing the hands and arm. Large quantities of lubricating warm fluids are recommended. My sheet-anchor is extract of belladonna, which agent I have for nearly thirty years used in the mare, cow, bitch, and cat.

Retropulsion, attempted by one or two crutches applied to the shoulders of the foetus, not to the neck, while the hand manipulations, aided, if need be, by the finger-hook—a blunt hook inserted on each side of the lower jaw when this can be reached towards the root of the ear or into the orbits—a cord tied round the neck, if it can be passed, and other devices may be tried. Cotton ropes I always use of varying lengths and thickness, and if I do not succeed with these the case, I conclude, is a hopeless one, and I destroy my patient and make a *post-mortem* to convince my client and sceptics that the task of bringing the foal into the world or of successful embryotomy was impossible. Rarely if ever does the dam survive.

It is recommended, and sounds easy, but is time very often wasted, that the animal be thrown on its back. Indeed, the success which has attended this procedure, in many cases reported by veterinarians in all parts of the world, warrants a trial, and should be adopted without undue delay. Very often the altered



FIG. 1.—Shows rough sketch of skull of hydrocephalous monster.

position of the mother at once disengages the head of the foetus from its position. If this does not happen, then the other means may be tried as in the standing position.

Pelvic version may be resorted to in some cases, the anterior presentation being converted into a "posterior one."

When reduction cannot be attempted and delivery of the foetus cannot be accomplished, then the obstetrist has no course left open to him but the adoption of embryotomy.

Text-books and lectures afford one little consolation, and if, as I said before, this procedure be carried out, in the majority of cases, especially in the mare, a true register would show a large death-rate, or such injuries as to preclude future breeding, and a store of future trouble.

Embryotomy recommended by many "should be resorted to early if the foetus is dead," which is nearly always the case in the mare.

The head may be amputated through the presenting portion of the neck, or the fore limbs may be removed subcutaneously at the shoulders. The latter is to be preferred in the majority of cases—at least, before incision of the neck is begun.

This gives more room for manipulating the body and effecting extraction. In many cases the removal of one fore limb will permit delivery. Whether one or both be removed, it is generally necessary to pass a cord round the end of the neck and pull it so as to bring the head nearer the inlet, where it may be possible to turn it into the genital canal, or at least amputate it more easily.

ANTERIOR PRESENTATION ; EXTREME DEVIATION OF THE HEAD; HEAD BENT UNDER THE BODY.

This is an exaggerated but much more serious form of head and neck fixture, especially in the mare, and it occurs in a similar manner to the preceding. The foetus in the anterior presentation advances to the inlet and the neck, fixed, and consequently the lower part of the head below the floor of the pelvis. This misdirection increases as the uterine contractions force the foetus backwards, and the head is pushed lower and more under the neck until it gets beneath the chest, and even the abdomen.

A few particular now *re* the dimensions of the hydrocephalous monster's head may be of interest. From junction of frontal to occipital bone (posterior dimension) $17\frac{1}{2}$ in. (longitudinal measure-

ment), transverse measurement $13\frac{3}{4}$ in. A football cut into equal portions transversely and placed on a normal foetal skull is as near the mark as is possible, and will afford some idea of the case and the marvellous result of extraction.

Contrary to the majority of cases encountered, instead of the cranial bones being soft and thin, this skull was hard as adamant, and the sutures found usually in the foetus entirely obliterated. Total ossification of the sutures.

The foal, too, has enormously developed, although the owner informed me the sire was by no means a large animal.

The dam was truly a medium-sized cart mare of nervous temperament, with a sprinkling of hunter blood.

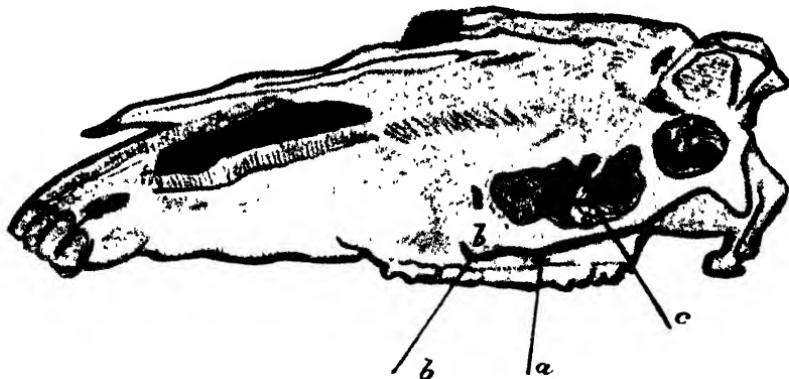


FIG. 2.—The normal skull.

Contrary to advice and to all reason, the callous farmer had the mare at work within three days, his excuse when I called to see her being "Well, she ate well, suffered no pain, or at least I did not think so, therefore I put her to work, and no harm has resulted."

Now it has struck me, and doubtless has been the experience of many practitioners, how hard-worked, aged, and enfeebled animals will bear the pains of maternity far better than stronger-looking, better-cared for, and less hard-worked animals suffer acutely at birth-giving, and yet make speedy recovery.

In passing I note that in the mare I have not yet seen a case

of torsion of the neck of the uterus or of the uterus (body) itself in a mare, but in the cow several, and been highly successful in effecting delivery and saving of life, even in a few instances by the rolling process, tersely described in Dr. Geo. Fleming's "Veterinary Obstetrics," and faithfully portrayed by Mr. J. M. McGillivray, M.R.C.V.S., of Banff, many years since.

Does physiological difference of structures and anatomical conformation of the cow render her more prone to twist of the neck of the uterus as compared with the mare?

In a busy practice one cannot always find time to search past records, but I should indeed be pleased to learn if any of the readers of THE VETERINARY JOURNAL scanning my article have seen torsion of the neck of the uterus in the mare, and how delivery was or is effected.

Again, there are two schools of thought and of procedure *re* the removal of placentæ in cow and mare. Should these be removed early or await Nature's efforts, supplemented by tonics, ecbolics, &c., to be cast off? *Re* also disinfection of the womb after delivery, is it wise or otherwise to disinfect the womb immediately or wait some hours, or even days?

My treatment is to disinfect immediately, but believe more in Nature to expel the placenta than to remove them quickly. The agents I have used as disinfectants are few—kerol warm and chinosol are my sheet-anchors, next perchloride of mercury, and even quinine sulphas in the days before prohibitory prices were in vogue.

Oil of eucalyptus, with equal parts of olive oil, after first syringing uterus with one of the afore-named disinfectants, has served me well. After waiting an hour, removal of fluids by syringe by hand, or by soft cloths inserted, or sponge mopping up, is practised.

In the mare I usually allow twenty-four hours to elapse, in the cow three to five days, before actively interfering.

Recently I had a case where twin calves were aborted in a decomposed state. Membranes retained twelve days. Removed. Feared septicæmia. Resorted to usual methods, also hypodermic injections of quinine and acid nit. hydrochlor. dil., and saved my patient.

I always insist upon removal of membranes from the byre, stable, &c., and thorough cleansing of the same, also keep the

animal standing for a few hours, if strong enough, without bedding, on a sprinkled floor of chlorinated lime.

For cases of monstrosities one cannot find any illustrations better than those of Dr. Fleming in "Veterinary Obstetrics," especially the late edition, corrected, &c., by Professor J. Craig, M.A., M.R.C.V.S.

Lacking, unfortunately, the means, and being also a poor artist, I append with apologies a crude sketch of the monstrosity I encountered, and hope, if ever similarly placed, to be as successful furthermore to have at least sober assistants to help me.

DEATH FROM LIGHTNING STROKE.

By H. A. REID, F.R.C.V.S.

It was reported to me in the morning following the night of a brief but severe thunderstorm that two cows had been found dead in a field and that several others were ailing. The owner suspected some form of poisoning, but also considered that lightning stroke might have been the cause of the sudden deaths.

I proceeded to the farm to investigate, and found two fine cows which had been in full profit lying dead in an open field close to a barbed wire fence.

There was no outward indication of any injury, save a small hole in the right ear of one of the animals, similar to what might have been produced by a high velocity bullet.

On removing the hide from this cow I found a very marked engorgement of the venous system. The jugular vein stood out as if injected, and on dividing the vessel the uncoagulated blood escaped with some force under pressure. Rigor mortis, which under ordinary circumstances should still have been present, did not exist, the limbs being pendulous and easily bent at the joints. Decomposition seemed already to have set in. The whole of the muscular tissue of the neck and fore limb of the right side was deeply congested and blackened. The tendinous portions of the musculature throughout the body showed numerous haemorrhages, but these were not present on the serous membranes. The heart appeared dilated, and was filled with partially coagulated blood. The lining membrane of the abomasum was

slightly inflamed. The liver was soft and very friable. The remaining dead cow had evidently received the current about the region of the jaw. The muscles in this situation were swollen and discoloured, being similar in appearance to the above description, only to a more limited extent. The most striking feature was the intense venous congestion of the subcutaneous vessels.

I looked through the rest of the cows composing the herd, but they seemed to have recovered from the shock or fright which they had received. The dead cows had been grazing in an open field close to a wire fence. Both were long-horned beasts. These circumstances may have contributed to their untimely end.

Although there is probably nothing unusual in the *post-mortem* appearances recorded, I subscribe them in the hope that the information may perhaps be of some interest and value to veterinarians who are called upon to investigate similar cases of sudden mortality of unknown origin.

General Article.

CLINICAL NOTES ON CONTAGIOUS MASTITIS.

By C. J. SANDERSON, M.R.C.V.S., AND J. BURTON CLELAND, M.D., CH.M.

THE appearance of symptoms cannot be described as constant either in their onset, nature, or severity. The disease would appear to occur at any time during the lactation period. The time of year and climatic influences seem to have little or no effect on its production. Neither excessive dryness nor floods appear to influence its spread. Deep milking cows with large, well-developed udders and teats are the most susceptible, but heifers on their first calf frequently get the disease in an acute form within a few days of calving. During the drying off process many cows are said to contract contagious mastitis; it is very probable, however, that the majority of these had been affected for some time previously, and the apparent onset of symptoms is due to the longer time from one milking to another which permits of a greater multiplication of the streptococcus in the gland, and allows these to reach portions of the gland which, during milking twice a day, they do not reach. Our experience shows clearly that in the mild type of disease so long as thorough milking is practised twice daily it is quite the exception to find many clots in the milk. On the other hand it was found that missing one or two milkings caused many clots to appear and the affected quarters to become hard, hot and painful. Thorough milking again twice a day speedily caused these symptoms to disappear. The value of careful milking and equally careful drying off can hardly be too strongly impressed on the farmer.

Paths of Infection.—It is generally conceded that the organism reaches the sinus of the udder by way of the teat duct. An attempt was made to demonstrate the presence of the streptococcus on the teats by means of swabs passed over the teats of both healthy cows and those affected with contagious mastitis, but in no case did Dr. Cleland succeed in isolating the *Streptococcus mastitidis* from sterile milk inoculated with these swabs.

Any injury to the udder, and more particularly to the teats, is a great predisposing cause to an attack of disease. On some

badly infected farms, if a cow's udder is badly bruised or torn, the injured quarter will certainly be the seat of an attack of contagious mastitis.

Sore teats such as one usually finds in dirty dairies appear to be an equally certain predisposing cause.

In H.'s outbreak all the first eleven cows affected had badly chapped teats. Our own experimental cows support the theory that an injury to the udder is a great predisposing factor in determining an attack of contagious mastitis. Thus, Cow S sustained a wound of the teat from a piece of barbed wire, and within seven days developed the disease. Cow E had sores on the orifice of all four teats before developing the disease. The scabs had to be removed by the milker before any milk could be extracted. She developed the disease in every quarter.

In both cows (S and E) Dr. Cleland found the *Streptococcus mastitidis* in samples of their milk.

Incubation Period.—The shortest incubation period met with was the case of a heifer which contracted contagious mastitis within four days of giving birth to her first calf.

Recent experience goes to prove that the disease may be latent for many months before clinical symptoms developed. Our attention was first directed to this point from the fact that a cow showed the disease under the following circumstances:—

This cow was purchased by a convent some two weeks prior to calving, and five weeks after calving developed an acute attack of mastitis. This case is of interest, as the cow came from a badly infected herd and the idea of infection after reaching the convent cannot be entertained for a moment. The cow was kept by herself in an enclosure which rendered any contact with other cows impossible, and was milked by a man who had nothing to do with any other cow. The organism must have invaded the udder during a previous lactation period. In such cases it is usual for the cow to develop a more or less acute attack immediately after calving, or to come into milk with one or more quarters "blind." In this case the cow milked perfectly for a period of five weeks before developing the disease.

Thirty apparently healthy cows from a farm on which the disease had not previously existed were, owing to drought, placed on a badly infected farm (January 31). On the day of arrival a quantity of milk drawn from every quarter was taken

and submitted to Dr. Cleland, who reported that four showed abundant streptococci, agreeing with those of contagious mastitis, while six showed abundant and one a few streptococci, not specially tested. On February 24 eight cows showed symptoms of the disease, having swollen, inflamed and painful quarters, with milk more watery in appearance than normal, and containing many clots.

Of the eight affected cows, only one showed the specific organism in the milk on January 31.

The fact that eight cows developed the disease twenty-four days after first exposure to infection is somewhat striking. Mention has previously been made to the presence of the *Streptococcus mastitidis* in the milk of cows that are apparently quite healthy, and if the presence of this organism in the milk of a cow is to be regarded as a potential case of contagious mastitis then the incubation period may be of many months' duration.

To clear up this most important point it will be necessary to examine many samples of milk taken from cows in districts where the disease does not exist.

The Types of the Disease.—As a result of our experience it is possible to divide the disease into three distinct types, viz., mild, acute, and peracute. In the mild type, which is in practice often undetected by the farmer, there is a slight alteration in the appearance of the milk, which may appear more watery than usual, and the presence of a varying number of small clots can also be detected if carefully looked for. To do this the first milk is drawn into the palm of the hand and allowed to run off, when a number of small clots will be found adhering to the skin. After the first few draws the milk will become normal in appearance. Milk drawn into a test tube will appear quite normal, but after standing for a few hours, in addition to what may appear to be an unusual quantity of cream, a deposit is sometimes found extending as high as one-third up the tube. It seems quite possible that these changes in the milk are not accompanied by any swelling of the udder. If swelling occurred it must have been slight and subsided very quickly in some cases observed by us. Where swelling was observed it was characterized by being hard and by its rapid disappearance. These cases were marked by the rapidity with which the milk regained the normal in appearance but not in quantity. The constant reference by

farmers to weak quarters in their cows is clearly due to this mild type, and an examination of the quarter generally revealed an area of fibrosis.

Relapses were almost constant. While the presence of an area of fibrosis in these cases was constant its location was by no means so. The most usual seat was found to be in the parenchymatous tissue just above the milk sinus. It was also found at the base of the teat and in the teat duct.

In a few cases which came under our observation, cows which showed this mild form when being dried off developed a severe form on again coming into milk after calving. In this type the cow's general health is unaffected.

In an acute case, premonitory symptoms are always shown, varying in severity with the nature of the coming attack. There were one or two exceptions to this, however, in which the constitutional symptoms were most marked, while the udder lesion was comparatively slight. Rigors, staring coat, cessation of feeding and rumination, increased respiration and pulse, and sometimes, though by no means invariably, a rise of temperature above 103° F. are the usual symptoms heralding an acute attack. Such symptoms are not, as a rule, noticed by the farmer, who usually states that the cow went out overnight in good health and was only found to be affected at milking-time in the morning. In an acute attack, the changes in the milk may vary greatly. The milk may be clotted and stringy but still present the appearance of milk. On the other hand, the secretion drawn from the udder may be a thin watery fluid of a greyish appearance, quite unlike milk, with numerous clots in it. Cases showing watery milk with yellow clots are more rare. In some cases the stringy curds can be drawn unbroken through the teat to the length of several inches. In severe cases the amount of fluid, whatever its appearance, capable of being drawn from affected quarters is always greatly reduced in quantity from the normal milk yield. In one case (S.'s herd) there was total suppression of milk secretion for forty-eight hours, the udder resembling that of a dry cow. At the end of that time secretion was re-established, but two quarters showed a thick, turbid, purulent fluid. Examination of the fluid revealed the presence of the *Streptococcus mastitidis*.

In other severe cases thick yellow clotted material of the

consistence of boiled custard is all that can be extracted, while frequently cases will be found in which the only fluid which can be obtained from the udder has the appearance of sherry wine.

In all varieties of the disease it is usual to find only one quarter affected at the onset; more rarely two quarters are implicated. Isolated cases are found where all four quarters are simultaneously affected. Sometimes the disease is confined to the quarter originally attacked, but it must be considered the rule rather than the exception for the disease to spread to other quarters. One cow contracted the disease in one quarter; fourteen days later a second quarter was affected, and ten days later a third. The fourth remained healthy during some months that the cow remained under observation. Extension of the disease to other quarters is not marked by the constitutional disturbance that appears during the original attack. This is correct when the type remains constant, but in some cases the disease in extending shows a greatly increased virulence. As an example of this, a cow, the property of Mr. S., developed an acute attack of mastitis in one quarter, and a bacteriological examination of the secretion revealed the presence of the typical organism. Constitutional disturbance was not pronounced, and the supply of milk from the healthy quarters but slightly diminished. Fourteen days after the original attack this cow was brought into the evening milking showing the following symptoms. Respirations sixty to the minute, rigors, frothing at the mouth, staring bloodshot eye, temperature $105\cdot4^{\circ}$ F., an occasional soft cough, and a staring coat. She gave less than a pint of milk from the three quarters. On the following day the disease appeared in the three previously healthy quarters, which became intensely hard, swollen, and painful, while the secretion was thick, yellow, and purulent, with a very repulsive odour. The owner finding the cow down and apparently unable to rise, promptly had her destroyed. He informed me that several similar cases had occurred on his farm. Unfortunately no samples of secretion from the second attack were taken for bacteriological examination. These cases are of peculiar interest as they show that a previous attack of undoubted streptococcic origin in one quarter confers neither immunity from nor resistance to a peracute attack in other quarters, the cause of which may or may not have been due to the *Streptococcus mastitidis* alone.

In the peracute type premonitory symptoms are well marked. The cow appears depressed, stiff in her movements, and stands in the paddock without feeding or ruminating. The attack is ushered in with rigors, increased respirations, rapid pulse, rise of temperature to 106° or 107° F., and greatly diminished milk secretion. Frequently an offensive diarrhoea develops. When brought into the milking shed the cow will be noted to have a staggering gait, with hardly sufficient strength to drag her hind legs over a rail 6 in. high. The eye has a sunken appearance. One or two quarters will be found intensely hot, hard, and swollen, the swelling in some cases extending as far forward as the navel, and almost to the root of the tail. It is difficult to extract any fluid from the affected quarters, and after manipulation and stripping movements all that can be obtained is a certain amount of purulent matter, which at first resembles inspissated pus, but which has a tendency to become more fluid after the sinus has been emptied. Usually the cows will lie continuously for forty-eight hours, neither feeding nor ruminating. Palpation of the udder causes pain.

The sequel of such cases as were observed by us is invariably abscess formation, which in the vast majority of cases extends to other quarters of the udder, rendering destruction almost imperative. In some few cases, after the lapse of a week or ten days, the cow's health appears to improve, but returning health caused little improvement in the milk yield. Cows affected with this type of mastitis become emaciated very rapidly. It may be a coincidence, but after the commencement of vaccine treatment in any herd no further cases of the peracute type occurred.

The following further work is suggested: (a) Examination of milks for the presence of the streptococcus from herds in districts where the disease does not exist. (b) Prophylactic vaccine treatment of heifers, and subsequent exposure to natural infection.

THE STREPTOCOCCI OF CONTAGIOUS MASTITIS.

By J. B. CLELAND, M.D., CH.M.

Our investigations into milks obtained from cows actually suffering from contagious mastitis, and from other cows in infected dairies, show the great prevalence of streptococci of a

more or less uniform type. Morphologically the streptococci varied considerably in size from time to time, apparently as a result of differences in media, usually forming long, sometimes exceedingly long, chains. Grown on peptone waters, to which various sugars have been added, they gave acid on glucose, lactose, saccharose, and usually on salicin. They did not give acid in mannitol, dulcitol, or, as a rule, on inulin or raffinose. They produced acid and clotting in milk.

In examining cows in which contagious mastitis is marked—the quarters being hot, swollen, and indurated, and the milk being watery, with clots—streptococci, as a rule, have been abundant. In some of the worst cases, however, the fluid on plating has, strange to say, been found sterile. Apparently the intensity of the infection had destroyed the invading organism. It was also noticed that many cows which showed no evidence clinically at any time of contagious mastitis, nevertheless might harbour these organisms in large numbers, in one or more quarters, over a considerable period of time. Occasionally such carrier cases would develop slight evidence of mastitis—swelling of the udder, and the presence of some clots in the milk. In these results it would seem that just as in diphtheria in human beings, carrier cases of contagious mastitis exist amongst bovines. Just as in diphtheria in human beings, there are cases that lead up to clinical manifestations of the disease, so in bovines. But we have so far not ascertained why a cow, which has harboured streptococci, apparently without ill-effects, for perhaps some while, should suddenly develop contagious mastitis; or why a previously unaffected cow should, on being infected by the organism, show in one instance clinical evidence of contagious mastitis, and in another case no sign or symptom of the disease whatsoever. It is possible that the property of this organism to produce clotting in milk may have something to do with the question. If the udder is systematically emptied twice a day, and the majority of the streptococci escape with the milk, the organism would have little opportunity of multiplying locally to a sufficient extent to produce clots of milk within the udder. If, however, only portion of the milk is removed twice a day, the quantity remaining would presumably be slightly acid, and the effect of the growth of the streptococci would really be half-way to the formation of clots. The presence

of a large number of streptococci in this milk would also seed well fresh milk as it collected, so that there would be a distinct tendency to the formation of more acid, and finally clots would occur if the udder had not been emptied. It is possible, therefore, that careless milking in this connection may be a predisposing factor. Slight injuries may also, perhaps, play a part. Further, the invasion of the finer ducts by the streptococci may render these organisms less liable to be dislodged, and their multiplication there may lead to the formation of small acid clots, which likewise would predispose further to the disease. Once clots have formed in any part of the udder, though they may to a great extent escape during milking, there would still be a tendency for some to remain, with a gradual aggravation of symptoms. These views are purely theoretical, as so far we possess no evidence to support or controvert them.

Two sets of experimental investigations have been specially conducted upon contagious mastitis. One of these consisted in attempts to cure cases of contagious mastitis by means of the injection of a sterilized vaccine of the streptococcus, and the other was an attempt to immunize animals by prophylactic doses of similar vaccines. The results of both these sets of investigations are, on paper, by no means satisfactory. On the other hand, the clinical results obtained impressed the owners of herds in the neighbourhood to such an extent that they have asked for curative and prophylactic vaccinations to be made upon their herds. The general impression left upon us has been that the use of the vaccine has diminished the severity of actual cases, and has brought about a more rapid cure than was otherwise to be expected without, however, having a corresponding influence on the streptococci present. Similarly, a protective vaccine has not prevented cows from contracting mild forms of mastitis. Vaccines can hardly be expected to exert much influence upon an organism multiplying freely in the milk itself. All it can be expected to do is to so protect the tissues of the body that invasion by these organisms from the milk is diminished. One therefore might expect to find vaccine treatment of clinical value but of little use for the elimination of organisms that were actually multiplying in the milk itself.—*Report of the Government Bureau of Microbiology, New South Wales.*

FIBROUS OBSTRUCTION OF THE TEAT DUCT.

BY PROFESSOR L. A. MERRILLAT.

Chicago.

THE phrase " stricture of the teat " is usually applied to this condition. It is too well known to require an introduction. Practitioners detest it, and writers either ignore it or else pronounce it incurable after enumerating various very ineffectual plans of attack.

Here is a benign, local, accessible condition that seem to baffle us so completely as to threaten our surgical enterprises with ridicule.

Steffin, whose latest book is given as the last word in cattle therapy, pronounces all stricture of the teat as unfavourable, except congenital atresia of the teat orifice and acquired stricture conveniently located near the extremity of the teat. All others are refractory, and should not be meddled with except at the owner's risk.

The fact that an animal so affected, no matter how valuable, is forever doomed as a sound milker seems to be an exceedingly good reason why veterinarians engaged in practice among dairies should work out some definite procedure that will bring this annoying condition into the group of curable diseases.

Several times the writer has attempted to excite some general discussion of stricture of the teat in meetings of veterinary associations. At every time the attempt failed to bring out any particular interest. The disease was simply passed off as a nasty one that could not very well be handled with any degree of satisfaction. The means employed almost universally were slitting operations with various instruments passed into the teat duct. Some have even advised a cautery, but no veterinarian to my knowledge has ever claimed even a fair degree of success with any of these operations.

The only experienced veterinarian known to me who referred to this condition as a simple matter is Dr. A. M. Wray, formerly of Richmond, Illinois, and now of Denver, Colorado. From the wealth of information he accumulated after thirty years of successful practice amongst dairy animals, he announced without equivocation that stricture of the teat is amenable to simple ablation of the growth through an invading incision made directly

over it. The only ones he feared were those located high up in the galactorforous sinus, and especially when these are complicated with fibrous bands stretching across the sinus.

He claimed that the secret of success was surgical cleanliness, and the open wound that was left to cicatrize without sutures. Suturing of the wound he found dangerous on account of the certainty of serious complications from infection from within. On the contrary, if the wound was not infected from handling and the milk was allowed to flow out unobstructed normal cicatrization followed. He advised careful milking or cathetrization and wiping of the wound daily with tincture of iodine as the after-care.

Coming from a reliable source—a modest man of exceptionally wide experience—these reports have always impressed me as especially significant, but as no corroborating evidence had ever come to my notice, and as veterinarians assembled in meetings seemed to doubt the wisdom of the procedure, no other effort was ever made to give the method further publicity. Recently, however, three cases thus treated have come under my personal observation, and the good results leave me no other course than that of recommending the method as worthy of an extended trial.

Case No. 1.—A heavy milking grade Shorthorn was found to be difficult to milk at one of the hind teats, and the veterinarian called in attendance found a small nodule located three-quarters of an inch from the teat orifice. Without interfering in any way with the condition, he called me to operate in the manner I had suggested to him on several occasions. The cow was alone in a small pasture when we arrived. She was cast and tied with ropes, the udder washed with mercuric chloride solution, and then painted with tincture of iodine. The teat being long, we found it possible to manage the blood by applying a tape Eschmark. A 4 per cent. solution of cocaine hydrochloride was injected subcutaneously at the proposed point of incision. The teat was grasped with the left hand and pressed to tense the skin. With one deliberate stroke of a sharp scalpel an invading incision was made right into the duct. The knife passed right through the nodule, cutting it in two unequal parts. By stretching the wound open with the thumb and finger of the left hand the bisected nodule turned upward into plain view. It was a whitish wart-like affair that was rooted firmly into the mucous membrane.

With the Mayo scissors the two portions were snipped off without difficulty. As there was some bleeding after removing the tourniquet we replaced it, with instructions to remove it in two hours. The wound was dusted with iodoform and left open. Each day the veterinarian in charge dressed the wound himself with tincture of iodine and dustings of iodoform, and at the same time catheterized the milk. There was a leakage of milk for ten days, but the wound behaved without serious reaction, and after two weeks normal milking was resumed. I saw the cow three months later, and as the veterinarian was not present I had difficulty in finding the previously affected teat.

Case No. 2 and Case No. 3.—As these cases were similar ones a single description will answer for both. Both were grade Holsteins, and both were affected with a single nodule the size of a small hazel nut right at the very base of the teat. Milking was impossible except with a catheter, which had been passed frequently during the preceding days. There was some local inflammation from the catheterizations and some swelling of the quarter indicating mastitis. The cows were tied with ropes in the recumbent position, cocaine injected subcutaneously, and an incision $1\frac{1}{4}$ in. long made into the duct and sinus. In both cases the nodule was again bisected into two unequal parts. Blood was baled with cotton sponges, and each half of the nodule was grasped with a forcep and drawn outward as it was snipped level with the scissors. Two small vessels in the subcutem were picked up and twisted, but no other attempt was made to arrest the bleeding, which was somewhat annoying but not harmful. The same after-care was recommended, but in these cases it was entrusted to the owner.

The local reaction owing to the pre-existing inflammation caused by the teat syphon and the mastitis was greater in these cases than in number one, and besides, the after-care was less intelligently carried out, but in spite of these facts a perfect recovery followed both of these operations.

Extravagant claims should not, of course, be made from this small experience, but when these three cases are coupled with the reports of Dr. Wray our optimism increases.

HARD MILKERS.

Wray also transformed a "hard" milker into an "easy" milker by simply rimming out the orifice with a very fine

bistoury. The teat is cocained, the bistoury passed into the orifice a quarter of an inch or more, and then a thin slice of skin and mucous membrane is rimmed out of the meatus. If too much is removed the teat may leak for a short time, but even this sequel is transient.—*American Journal of Veterinary Medicine.*

LACTIC ACID BACILLI IN THE TREATMENT OF WHITE SCOUR OF CALVES AND OF INFECTIVE PROCESSES IN MAN.

By J. B. CLELAND, M.D., CH.M.

IN 1909 the occurrence of white scour in calves at the Berry Stud Farm was brought under our notice. As the result of a visit to the farm, in company with one of the veterinary officers on the stock branch, I suggested that the effect of milk soured by lactic acid bacilli might be tried. The particular type of organism selected was one of the ordinary stock butter starters of the Bureau. Mr. Quirk, who was in charge of the farm, soon had an opportunity of testing this remedy on three calves, which were badly affected with white scour. After giving a dose of oil, followed by barley water for thirty-six hours, the calves received equal parts of milk and barley water with lactic acid bacilli added. The calves made rapid recoveries and were cured, leaving no appearance of the usual emaciated condition that is generally noticeable in recovered calves. Besides the three calves severely affected, there were eight others that were slightly affected. These also made satisfactory recoveries.

The apparently satisfactory results obtained in these cases led, chiefly through the instrumentality of Mr. Quirk, to applications being received from various dairymen in the South Coast whose calves were affected with white scour. To all those seeking help in this respect cultures of lactic acid bacilli were submitted, with the following directions for using them:—

“ Prepare a pint of fresh milk by boiling it, and then cooling to about the body temperature.

“ Put into it the culture of lactic bacilli supplied—contents of one tube to each pint of milk. (To open the tube, mark the glass with a file, cut and break.)

"When mixed, the pint of milk should be put in a warm corner (of the kitchen) for about twenty-four hours.

"This will furnish enough to add to the rest of the milk which forms one feed for the calf. Six tubes will be forwarded each day, being thus enough for six calves with two feeds a day each."

In several instances replies of a very satisfactory nature have been received from persons using soured milk. Mr. Quirk has had no further trouble with this disease; as the symptoms of white scour manifest themselves he sends for cultures of lactic acid bacilli, and has so far easily controlled any outbreaks.

During the year Mr. T. Kennedy, of Reidsdale, asked for cultures in April and September. In three separate outbreaks in which he used cultures forwarded by us he has described his results as "splendid."

The following letters may be quoted in more detail as indicating that there seems to be some distinct value in this remedy, although it must be pointed out that so many factors enter into the question that the remedy can still only be considered on trial. Naturally those persons to whom success has followed its adoption attribute the good results to the remedy entirely, but I would like to emphasize a note of warning—the question must be considered as not as yet definitely settled.

Mr. T. C. Handebo, of Llangothlin, writes: "A line in reply to your letter of November 2 re lactic culture, I will speak of it truthfully as I found it, it is the best remedy I ever had the pleasure of using for white scour in calves. Before receiving the culture I had sixteen good calves; ten of them got white scour, and from that it turned to blood scour. One of them died, and five out of the other nine were in a dying condition. I tried all old remedies which were a success in previous seasons, but seemed to be a failure this time. After using the lactic culture as directed, I had no more bother with them. Sometimes some of them have a loose healthy green kind of scour. They might be like that in the morning, then quite right at feeding time at night; I do not take any notice of that. I am feeding twenty calves now, and had no trouble with white scour since you sent me the culture. Before getting or using it my patience was quite exhausted."

In another letter from Mr. Handebo, he says: ". . . wish to state that I have had the same good results with your

lactic culture (B/M. 12/7314) given to my calves. I have not lost any calves with scour since I used the good remedy. At the end of this month I will write to you again, and I think by that time I can ask you to cease sending the lactic acid culture, for I think they will get along all right then . . . ”

Another correspondent, Mr. Giles Moore, of Guyra, writes:

. . . “ Having given your lactic acid culture for scour in calves, I can say that it is the best thing I have yet tried. We have lost two calves only out of forty-four. Please do not send any more, as the calves have all grown up. Thanking you for past favours . . . ”

For human diseases a certain number of cultures have also been issued, and, especially in intestinal conditions, some good results have ensued. In a case of sleeplessness, possibly due to chronic intestinal toxæmia, some distinct benefit was found as well as in other similar conditions. At Dr. Bradley's suggestion the injection of soured milk cultures in cases of gonorrhœa was tried with apparently good results. In one or two cases of chronic sinus infection, when the cultures were injected, no good results seemed to follow.—*Report of the Government Bureau of Microbiology, N.S.W.*

Clinical Notes.

ANOREXIA IN THE HORSE.

By G. MAYALL, M.R.C.V.S.

I HAVE recently had two troublesome cases of what I have termed anorexia for want of a better descriptive name. Possibly they may have been cases of passive congestion of the liver, but in neither case was any jaundice shown, but in one patient there was some tenderness and dulness exhibited on percussion over the liver region. Both patients were black in colour, one being a mare and the other a gelding. Both had been losing condition gradually for some weeks, and finally ceased eating altogether. On examination there was no rise of either temperature or pulse, coat staring, extremities and ears somewhat cold, thin condition, and some scabby sores about the neck and hind legs. Corn food and hay, although good in both cases, were absolutely refused, but water was taken in moderation. The pulse of both patients was regular, but so weak as to be almost imperceptible. Neither of them looked fit to stand a dose of physic. Balls of nux vomica and calomel, drenches of acid nitro-hydrochlor. dil. and quinine, ounce doses of Gregory powder in quarter of a pint of whisky, &c., were given. The passage of regular motions, which had been absent for one or two days at a time, was thus re-established. It cannot, however, be written that the drugs given brought about much improvement in the appetite. Under their influence the patients began to eat small quantities of food half-heartedly and gingerly, but they progressed but slowly. Carrots were now obtained, and cut into thin strips lengthways and mixed with corn food in a bucket, which food had been previously moistened with linseed mucilage. Gradually both subjects came on to their usual consumption of food and got back their condition, and both are working again. The duration of treatment and nursing lasted two months in each case. Carrots were given in the bucket rather than in the manger, so that they could not be easily eaten and the corn food discarded. One patient could find the carrots in a trice when given with corn in the manger, and would have only consumed them if they had not been cut into very thin slices, put in a bucket, and intimately mixed with the

corn. Without the carrots it is doubtful if the anorexia would have been overcome. Given in moderation, they are very valuable in such cases. Given in excess, I consider I have seen horses killed by them. Other observers have suggested that carrots contain a poisonous vegetable alkaloid which acts ultimately on the heart, causing syncope, and I remember a case well which used to have a bucketful and a half of carrots a week, where on *post-mortem* nothing could be found but indication of sudden heart stoppage, the horse dropping dead in the stable. There was no organic disease of the heart.

Cases of anorexia in the horse often cause owners to be troublesome to veterinary surgeons, and the cases themselves are frequently slow and annoying ones. These have been recorded to show a way out, and if the veterinary surgeon can give the carrots himself in the way indicated and note results, he will often be repaid for his trouble.

AN INTERESTING AND OBSCURE CASE.

By JOHN McBIRNEY, M.R.C.V.S., M.P.S.I.

I WAS lately called in to see a horse. This animal showed signs of wasting, and I understand from its owner he noticed that it had been failing in flesh during the past three months. On being taken from the stable in the mornings it was very stiff, but after walking a short distance it would get better, and be able to do its daily work as usual. The horse got worse, and when I visited him he was standing, frequently attempting to urinate, bending so as almost to touch the ground with his abdomen, and then he would resume natural posture without passing any water. Patient had profuse salivation from mouth. Temperature 104° , respirations 56, and pulse steady. I gave a draught that seemed to give relief. He now became quiet, lay down, and fell asleep. In about an hour I saw the horse again. He had same symptoms as before. Temperature now 99.4° . Subject died that evening. I conducted an autopsy. I hope to send to the publishers what it revealed. Meanwhile, I would like to know the views of your readers.

RESULTS OF AUTOPSY.

There was a healed rupture about the size of a florin in large colon, also a peritonitis healed about size of the palm of hand. On further examining the large colon, about 2 ft. away from healed rupture there was another rupture recent of somewhat similar size to healed one, and a fairly sized patch of peritonitis. On the gastric mucous membrane there were patches of a peculiar reddish colour. On manipulating some membrane came away. Other patches were apparently healed, and did not come away on manipulation. The other organs and membranes appeared healthy.

JOHNE'S DISEASE IN THE DOG, OR WHAT?

By HENRY B. EVE, M.R.C.V.S.

Folkestone.

Subject.—A pedigree brindle bulldog, 3 years old, in poor condition.

History.—Purchased by my client from an officer going to the Front through the medium of a doggy journal. The animal arrived in due course, after a long rail journey, in a very weak, emaciated condition.

Symptoms.—The dog appeared unthrifty, tucked up in flanks. The appetite was unimpaired, in fact, the dog ate ravenously, seemed never satisfied, and I suspected that the cause was due to "worms." The animal had a staring coat, itchy condition of the skin, which emitted a peculiar odour, somewhat like "urinous eczema," muzzle moist, eyes bright, but rather sunken from the absence of intra-orbital fat, visible mucous membranes were pale, anaemic; anasarcaous oedematous swellings in the "inter-maxillary space" and under the sternum, intense thirst, but no fever present. The faeces were frothy and full of air bubbles, and contained undigested particles of food. The diarrhoea was of an intermittent character, and recurred every three or four weeks at more or less regular intervals. The pulse was weak and faster than normal, and the cough present was exactly like a tubercular patient. The dog moved with a straddling gait, arched its back, and at times urinated like a bitch, especially noticeable when the diarrhoea was very acute,

shreds or bloodstained mucus being seen in the dejecta. Auscultation of the chest revealed nothing very definite in the shape of râles, but there was a general dulness on percussion manifest.

Diagnosis.—“Pseudo-tubercular enteritis,” or “what”?

Prognosis.—Unfavourable.

Treatment.—Isolated dog, and kept it under observation for some time; dosed for worms; animal passed a few. Gave internally diarrhoea tablet triturates (Parke, Davis and Co.), opium, camphor, pulv. ipecac., and lead acetate, which had the desired effect; afterwards lactated pepsin (P. D. and Co.) to act as a digestive agent, followed on by creosote and Angier’s petroleum emulsion, and finally stomachic tonics (ferri carb., sacch. and nux vomica, cinnamon, bismuth carb.), powders in food.

Diet.—Glaxo, barley water, raw meat (minced), tripe, cooked in milk, cod-liver oil biscuits, boiled rice.

Result.—Dog improved wonderfully, gained flesh, and was returned to owner, but am afraid the apparent recovery is only temporary and disease will return.

Remarks.—I have never seen a similar disease in a dog before, but have met with several cases in cattle, also cases of tuberculosis in “bulldogs,” so have recorded these few notes, thinking the case may be of interest to others. I shall be glad to hear if any other canine practitioner has met with a similar case.

Translations.

CONTRIBUTION TO THE KNOWLEDGE OF PROGRESSIVE BULBAR PARALYSIS OF THE HORSE.

By OSCAR BÜRGI.

Zurich.

UNDER the description of bulbar paralysis we understand a diseased condition which is characterized by paralysis throughout the extent of the so-called bulbar nerves. This paralysis involves the sixth to twelfth pair of nerves which arise in the medulla oblongata, formerly called the bulbus, on the floor of the fourth ventricle.

The combined paralysis has also been noticed in man, where it leads respectively to changes of the motor nerve substance of the hypoglossus, facialis, and vagoaccessorius.

As a result there occurs paralysis and atrophy of tongue, lips, and muscles of mastication, as well as of the ocular, gum, oesophagus, and laryngeal muscles. Disturbance of speech, difficulty in mastication and swallowing, increased secretion of saliva, and deficient reflex irritability are the clinical symptoms of the condition which may be accompanied by those of foreign body pneumonia. Similar paralysis occurs in our domesticated animals, and has been noticed in the horse and cow. As a result the diagnosis of bulbar paralysis has been frequently commented on in veterinary literature. As in man, so also in animals, two forms of the disease arise, namely, an acute and chronic. The former occurs in cattle, as several of our publications prove. Zschokke and other practitioners mention and describe an endemic paralysis of the oesophagus, or acute bulbar paralysis of cattle. This was characterized by marked paralysis of the tongue, absence of fever, cessation of rumination, and peristalsis. Progressive paralysis caused a high mortality.

Cases of acute bulbar paralysis have also been noted in the horse. Many authors refer to it. Every treatment proved unsuccessful. In the clinic here we had opportunity of noticing the malady in the horse.

A six-year-old gelding used for riding had been treated for an attack of catarrh. Body temperature, pulse, and breathing were normal. A tenacious discharge from the nose was present, with regurgitation of particles of food, salivation, and quidding. There was coughing and increased pressure susceptibility at the larynx and pharynx. By sharp friction applied at the lower parts of the neck the irritable cough ceased. The symptoms of regurgitation and dropping of food in balls continued, and so the horse was brought into hospital.

The animal was dull, but in fair condition. Temperature, pulse, and breathing normal. There was drooping of the left dorsal eyelid, and slight protrusion of the upper lip to the right. The left pupillary reflex was deficient and the pupil dilated. The mucosæ of the head were of normal colour, but a tenacious discharge from the right nostril was mixed with particles of food. There was increased sensitiveness to pressure in the region of the larynx and pharynx, as well as in the upper third of the trachea. No swelling of the glands of the head, sinus regions normal.

Examination of the mouth showed teeth and gums normal, but the oral cavity contained a large quantity of food mixed with saliva. Especially marked was the condition of the tongue. It could be very easily drawn from the mouth, and its point remained for some time protruding between the lips. The horse drank water, but regurgitated it, especially through the right nostril. Hay and straw were taken with avidity, but could not be swallowed, and by mastication movements were pushed into the left angle of the mouth. Balls of food as large as nuts and hen's eggs were deposited in the manger, and although the horse would seize and grind at long hay all day it could not swallow any, and so became gradually emaciated. Left-sided atrophy of the tongue became very marked and the paralysis of the *facialis* more accentuated. No treatment was of avail, and the patient was slaughtered after three weeks.

On section the sinuses of the head were normal; at the base of the tongue there was a large quantity of balled food. The tongue itself was at its left base totally atrophied. It felt quite soft, and the mucosa there was greatly wrinkled; the papillæ of the region were very prominent. The *musculus styloglossus* was devoid of muscular fibre, and only represented by a thin, pale-yellow cord. The *musculus hypoglossus* showed marked degenerative atrophy. The muscles of the right side of the tongue appeared quite normal to the naked eye.

In most cases already recorded a double-sided paralysis has been noticed. Here it was limited to the left side. Whether ætiologically the origin of the infection was due to the catarrh is not certain. Generally, food poisoning and infectious material are considered to be the cause of bulbar paralysis.

G. M.

CLINICAL CASES.

(1) CARCINOMA OF THE SUPRARENAL BODIES IN THE HORSE WITH HÆMORRHAGE INTO THE ABDOMINAL CAVITY.

A HORSE suffering from stoppage died five hours after being attacked with symptoms of internal hæmorrhage. On *post-mortem* a tumour double the size of a man's head was found in the left kidney region, involving the left kidney, in which there was a rent 3 cm. long. The abdominal cavity contained 12 litres

of fluid blood, and in the folds of the mesentery there were six fresh blood clots as large as one's fist. The tumour could be recognized as a greatly changed carcinomatous left suprarenal body.

(2) AMYLOID LIVER IN THE HORSE, WITH RUPTURE OF THE ORGAN AND INTERNAL HÆMORRHAGE.

As a result of rolling and falling down, especially in cases of colic and where there is an amyloid liver, rents in the parenchyma of the organ occur. Such a case came about in a horse with colic which, after half an hour, died of internal hæmorrhage. Because icterus was absent clinically amyloid liver was not suspected, but a rupture of an abdominal organ. On rectal examination roughnesses on the intestinal mucosa could be felt which were attributed to particles of food, but which proved to be due to blood clots. The liver weighed 15 kilograms, and showed friable, soft consistency and greyish brown and brownish yellow colour. In the right lobes of the liver there were two rents. Liver, spleen, and kidneys showed amyloid degeneration. The cause of the degeneration was not evident.

(3) SUPRASCAPULAR PARALYSIS AS A RESULT OF CALLUS FORMATION AFTER A HIATED SHOULDER-BLADE FRACTURE.

Since the summer of 1912 a horse previously lame in the left shoulder showed suprascapular paralysis. The horse died of colic, and on *post-mortem* there was a doubly thickened lower third of the scapula covered with irregular jagged bony growths which completely enclosed the suprascapular nerve. The muscles at the back of the shoulder-blade were atrophied and degenerated.

(4) TREATMENT OF STENOSIS OF THE OESOPHAGUS WITH ARECOLIN.

In 1896 Fröhner recommended the injection of arecolin for foreign bodies in the oesophagus and to await oesophagotomy. Since the outbreak of War dry and damp cut roots have been fed in increased quantities to horses, and numerous cases of obstruction of the oesophagus have occurred. In such cases arecolin has given relief. In one case $\frac{1}{5}$ of a gramme of arecolin injected into a horse caused it to cry out with pain, but after a few hours the obstruction had gone, and the cry was attributed to a very painful contraction of the oesophagus on the fixed and sharp-pointed piece of root.—From *Swiss Journal of Veterinary Medicine*.

Abstract.

GASEOUS CYSTS IN THE MESENTERY OF A PIG.

By J. B. CLELAND, M.D., CH.M.

UNDER the term "Mesenterial Emphysema of Hogs," Ostertag ("Handbook of Meat Inspection," 3rd edition, p. 288) describes and illustrates this interesting condition. He points out that authorities differ as to its origin, some believing that it is due to the formation of gas by micro-organisms, and others that it is due to some other cause.

In July, 1911, specimens from a pig affected with this disease were submitted for examination. The mesenteric attachment of the small intestine was filled with congeries of many small gaseous cysts, some as large as peas, and others smaller. Besides filling the mesenteric attachment, they extended in a wedge-shaped way about half an inch into the mesentery. Here and there some of the small cysts were pedunculated, and occasionally attached to the ends of cysts were small dark masses, apparently consisting of smaller cysts filled with altered blood. One large cyst was seen which was definitely filled with clotted blood. Sections showed that the cysts appeared to be lined by elongated connective tissue cells several layers deep, forming a fibrous tissue wall. There were numerous eosinophile cells in the mucous membrane. No giant cells were met with. The specimen was preserved in formalin. The gas was afterwards collected from some of the cysts and examined by my colleague, Mr. Darnell-Smith. He could find no evidence of the presence of carbon-dioxide, but showed that the gas, as present in the preserved cysts, consisted of oxygen and nitrogen in the proportion of 1 to 7 approximately. The absence of carbon-dioxide was indicated by the failure of a solution of caustic soda to absorb any of the gas during the period of one hour. By means of an alkaline solution of pyrogallic acid, the bulk of the gas was diminished by about one-eighth after twelve hours. The remaining gas was non-inflammable, and would not support combustion, and was presumably nitrogen. These results agree in general with those quoted by Ostertag. This presence of oxygen and nitrogen in the cysts seems to me to suggest an origin from the gases normally in solution in the body fluids rather than from the action of some invading organism. The condition would well repay the attention of the physiological chemist.—*Report Government Bureau Microbiology, New South Wales.*

Reviews.

Medical and Veterinary Entomology. By William B. Herms, Professor of Parasitology in the University of California; late Professor of Zoology and Parasitology in the San Francisco Veterinary College. Published by the Macmillan Co., New York, 1915. Pp. 393; illustrations 228. Price 17s. net.

There is no branch of medical science that is more important than the study of the part that insects and arachnids play in causing and transmitting disease in man and beast. We think also that there has been no greater advance made in any field of veterinary and medical work than in that of entomology. The immense literature on the subject, however, has been widely scattered and not always easily accessible. This book brings a big area of the field lucidly into view, systematizes much of the present knowledge of this special sphere, and as it is written by a man eminently able to deal with the matter, it may be accepted as a reliable text-book for students and a trustworthy handbook for the use of physicians, veterinarians, and public health officers. Apart from the loss which insects and insect-borne diseases cause to the community, the study of insect life history and control is very valuable and essential in the interests of preventive medicine and public health. The transmitters of malaria and yellow fever need constant war waging against them, and if we in this country know practically little of their ravages, yet we can directly appreciate an account of the scientific measures to be taken in combating a plague of house-flies, cockroaches, fleas, or bed bugs, and we can learn how to act in these cases from the instructions of the author.

The book is especially strong on the subject of mosquitoes, the house-fly, and myiasis (a term referring to the presence of and resultant disturbance traceable to insect larvæ). Concerning these larvæ there is an interesting note on warbles in human beings, and in one case mentioned the maggot of *hypoderma lineata* travelled from just below a boy's left knee to the back of his ear.

The importance of mosquito control is dwelt on fully, and the methods to be adopted to cope with the pests are described: in some cases the breeding grounds in the shape of stagnant pools have had to be obliterated, and pouring oil on the surface of the water is another measure that is regularly taken. These pages are very interesting reading, and here we learn how bats, gold fish, roach, minnows, and dragon-flies compass the destruction of mosquito life and aid human effort.

There has been a widespread outcry recently in this country which crystallized in the words "Kill that fly." We have read

nothing more masterly than the instructions given in this book for carrying out the procedure. The idea that the house-fly is one of Nature's scavengers is shown to be almost entirely false; it is really a very poor scavenger. On the contrary, there is very good evidence to show that it is responsible for the spread of such diseases here as typhoid fever, tuberculosis, dysentery, and infantile diarrhoea, and abroad Asiatic cholera, frambœsia, and ophthalmia.

There are excellent chapters on blood-sucking muscids (one of which is suspected of causing poliomyelitis), ticks, mange mites, venomous insects, and arachnids.

The volume throughout is full of good illustrations, most of which are original. The author is to be congratulated on producing such a serviceable and useful text-book, and the publishers deserve all praise for their share in the work. By reason of the ground it covers, the way it has been compiled, the nature of its dealings with a special field of science none too well explored yet, or discussed previously, the work should become an indispensable classic to all those interested in medical and veterinary entomology.

G. M.

Essentials of Veterinary Law. By Henry Bixley Hemenway, A.M., M.D., Fellow of the American Academy of Medicine. Author of Legal Principles of Public Health Administration. Veterinary Medicine Series No. 10. Cloth bound, pp. 290. Edited by D. M. Campbell, D.V.S. Published by the *American Journal of Veterinary Medicine*, Chicago.

This, the tenth volume of the Veterinary Medicine Series, breaks somewhat new ground in veterinary literature. We have had the "Law of Horses" and the legal aspect of the examination of horses as to soundness put before us long ago, but we know of no special book devoted solely to law as it affects the veterinary surgeon personally and in his work altogether.

It is rather a delicate matter for a man who is not a lawyer and who has not made a special study of the law (or, in other words, who is not an expert) to pose as an authority on legal matters as they affect us, but as far as we can make out the advice given in this book is helpful and fairly sound. As it relates chiefly to American law, which is not so old in precedents as our own, and varies greatly, we believe, in different States, then if the author takes a wide and comprehensive enough outlook and bases his conclusions logically on a sufficiency of legal records accessible to him, there is no doubt that his words will be valuable and carry weight, even if only comparatively. Hence we note primarily that references have been consulted and are made on nearly 800 cases that have been decided in the American Law Courts, and conclusions are founded on these. In many instances, however, these cases refer to decisions in respect to the medical profession, which are assumed to be also applicable to us. The veterinary profession in every land is comparatively

a small one, consequently judicial decisions affecting us directly are somewhat scanty.

The book is divided into four main parts, dealing with Legal Principles, Law pertaining respectively to Veterinary Practice, Governmental Control, and Animals generally. The veterinary surgeon who acts as bailee may gather a fair idea of what his rights and responsibilities are from the pages on "Bailment." The lines on Contract and Lien are important, and the man who is called in a hurry to a street accident may learn how to act circumspectly if he wants to be paid for his services. We consider the book to be scrappy and not explanatory enough in some parts, and notice this chiefly in the pages dealing with meat inspection and the examination of horses as to soundness. Although the constitution of a contract and the duties and rewards attached to a faithful carrying out of its principles are discussed and the matter of compensation is fully dealt with, yet we see no reference to the rights, privileges, and responsibilities of the parties to a *formal contract*, verbal or otherwise. Many veterinary surgeons have verbal contracts for attendance and medicine to animals, although similar procedure is "rara avis" in the medical profession. Few men are wholly acquainted with the ins and outs of these instruments; many suffer injustice quietly under them. The law relating to Governmental inspection will be more important to Americans than to us. There are some interesting lines, however, on unforeseen serum injection sequelæ. These read. "If after the use of serum septicæmia breaks out among the animals the veterinarian may be morally certain it was due to the serum used; but the company will be just as sure that it was due to the operator's lack of care. A reserve package of serum kept properly cold will be the means of demonstrating the truth. Without this evidence his own reputation as a veterinary surgeon may be lost, and he may be held in civil damages." Although the book discusses American law in the main, yet much of the matter seems applicable to us here. We like the book, and consider it trustworthy if read with discernment. It ought chiefly to help us from becoming entangled in legal proceedings against ourselves. It is certainly interesting, instructive, and novel, and we admire the author's pluck in writing such a book without a precedent to guide him. We sincerely wish, however, that there was more literary activity among veterinary surgeons here, and that we had an up-to-date treatise on the subject of veterinary law written by a man holding both the legal and veterinary qualifications.

G. M.

**Board of Agriculture and Fisheries—Special Leaflet No. 54.
The Rearing of Chickens.**

This is a very valuable and important little leaflet that can be studied with profit by all poultry rearers. The need for bracing up and encouraging the poultry industry in this country is great, but unless there is a thorough understanding of methods

of rearing and feeding, disappointment and lack of progress and enthusiasm will lay hold of beginners in fowl keeping and so check any increase in an important food supply operation. As in human affairs, the loss of babes is primarily due to faulty diet and management, so in animal and fowl-rearing matters the great death-toll occurs in early days, and can be largely avoided and considerably lessened if the teachings of science are followed at the critical time. There is nothing superfluous about the leaflet. It is plain, straightforward, and lucid. It is well written and well arranged, and deals with the management and feeding of chicks up to the eighth week. In some cases perhaps the food bill might be varied and cheapened. We see no mention of dari; bran is dear now, and grain food is often cheaper than biscuit meal. We are quite in the dark as to the authors of the Board of Agriculture leaflets. It is a pity for veterinary science that we do not get any clinical material from the Board of Agriculture staff. The man who has written this leaflet on chicken rearing has done good service to, and is a true benefactor of, his country. If the leaflet is used and circulated as it ought to be, the results achieved will far outweigh any trouble and expense incurred in its production.

G. M.

NOTICE TO OUR READERS—SHORTAGE IN PAPERS.

The Government are now restricting the imports of certain articles and material, among them the pulp used in the manufacture of paper, and they have invited the paper and the allied trades to cut down their consumption at least one-third.

There are several ways in which the reading public can help to minimise wastage, and among these the following is most useful. Many readers subscribe to the office, or through their newsagent, but there are a great number who are chance purchasers at newsagents, or who miss buying a copy one month and occasionally purchase an issue. This results in publishers having to print a number to meet the demand of the occasional and chance reader, and under such conditions they cannot be sure of the actual number required.

This shortage of paper supply also compels publishers to reduce the size of the papers proportionately.

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THE

VETERINARY JOURNAL

JUNE, 1916.

Editorial.

ORGANIZATION, COHESION, AND CONSOLIDATION.

INDIVIDUALISM had its good traits in days gone by and accomplished much advance. In some respects, given the right sort of leader and governor, abuses and injustices were perhaps more quickly remedied and set right than at present. But in many cases the harsh autocrat could ride roughshod over individual resistance and effort. Then, single stars shone serenely and gave a certain amount of brilliance and stability to the industrial, political, and scientific firmament. Now, men of the same way of thinking and with identical ends in view banded together; the stars coalesced into moons, whose light diminished the refulgence of the smaller luminaries. In other cases splendid, powerful, and illuminating suns arose, lighting the way for the progress and betterment of mankind and throwing the moons into the shade. The Amalgamated Society of Engineers, the Spinners' Union in the cotton trade, the Dockers' Union in transport circles, the Miners' Federation are instances where bodies of individual men have united together and consolidated to uplift their trade and calling. The medical practitioners of the land know how to protect their rights, advance their claims, and secure their position by a pull together. Lawyers and politicians, whilst frequently speaking against the opinions of others of their fraternity, understand how to clear the decks for action when their ship is assailed or threatened. The members of a trade or profession do not advance nowadays by the isolated efforts of individuals, but by cohesion, concentration, and concerted action. The present War will be won as much by reason of the Allies sticking together and acting in unison as by any other force that can be created or brought into play. In good collective exertion broad views will be taken which benefit the weaklings and include them in the general measures of progress, whilst

not forgetting the claims and aims of the stronger units to serious consideration. Fads, foibles, magnified importances of trifling value to the good of the general body will not be allowed to divert and distract the leaders of communal movements or the movements themselves from the straight and forciful way to social and material betterment.

On what foundations have these communities of aims and interests been erected? How have they grown from toddling infancy to robust and vigorous manhood? Is it not by being built up by energy, watchfulness, cautiousness, rules and regulations, and money? Through lean years, good and ill report, success and failure, the members of the bodies have stuck together. If they had dared and risked more some of them would have won more for their class. By political power and the right of combination they have uplifted themselves. Clearer vision and more decided views might have led them further still. There is a tendency at times for those who make requests or desire objects to be too easily pleased and to let the stiff upper lip relax too soon.

We have tried to indicate the way in which bodies of men advance and obtain their rights, and we ourselves can take lessons from history and daily events. Organization and consolidation offer the best chances of success in attack and defence.

Only recently we have seen how the best organized body in our own circle can put up a good defence against a charge of laxity made against veterinary inspectors in connection with an outbreak of foot-and-mouth disease. Because of a vagary in the occurrence of the disease, unaccountable to the lay mind, the Central and Associated Chambers of Agriculture asked the President of the Board of Agriculture to institute an independent inquiry into an outbreak of the epizootic at Butleigh. The President decided that it would not be in the interests of the efficient administration of the Diseases of Animals Acts to have an independent inquiry, he did not propose to delegate the Board's responsibility to any other body, and he considered the action of the veterinary inspectors quite correct.

Grievances can only be remedied by concerted action and the powerfulness of the force brought into play. In this connection we think something stronger, if possible, will have to be undertaken before the question of H.M. Treasury and a long service pension, as relating to Mr. H. T. Ashbee, can be focussed so that both parties may see eye to eye.

We should all be doing as much as we can now to set our own house in order. There will be ground to gain, problems to solve, attacks to repel, and much defence work to be undertaken after the War. If we are to cope with the business we must be united, determined, far-seeing, and not poverty-stricken as a body.

G. M.

WELCOME INFORMATION AND THE COROLLARY.

THE following question was put on May 22, in the House of Commons, by Mr. MacCallum Scott, M.P., to the Under-Secretary of State for War: "Whether officers in the A.V.C. on active service are prohibited from contributing to professional papers records of clinical, medical, or surgical cases which come under their notice; if so, what is the object of such restriction; whether he has considered its prejudicial effect upon the development of veterinary science; and whether he can hold out any prospect of a relaxation of the restriction?"

Mr. Tennant replied: "The answer to the first part of the question is in the negative, and the second part therefore does not arise."

There has been a scarcity of clinical reports from those engaged in Army practice for some time now. It was not so apparent in the early days of the War. This has rightly or wrongly led to the assumption that restrictions of some kind exist on the furnishing of records of interesting cases, observations, or investigations eminently helpful to the advance of veterinary science.

The above-quoted query and answer should clear the air as regards this matter. Opportunities for unique experience in respect to injured and ailing horses exist in our military spheres at the present time, and many of the men in the A.V.C. have facile pens. Is it intended to hoard up all the valuable scientific pabulum that is in process of being gathered, and then to flood the professional papers with it in peace time and cause a literary and mental glut? This can never be so beneficial as a gradual unloading of the information when the necessity for its application is most evident, when the field is the most extensive, and when the lessons to be learnt can be grasped and assimilated step by step.

Although the health of the Army's horses is stated to be very fair, many interesting and valuable facts in connection with contagious and infectious diseases must have been observed during transport and in field life. Where horses, too, have been gathered together in such large numbers rare and isolated cases of exceptional interest and value must have been dealt with. Occasionally, also, one is led to expect a contribution to canine medicine and surgery, for dogs are doing their little bit in the conflict as well as horses.

We hope to receive some very readable notes as a result of this dissertation, and trust that those of our *confrères* in prominent positions in the Army will not forget us, but encourage the reporting of interesting facts, and do what they can to help on the further development of veterinary science.

G. M.

Original Communications.

CYSTIC CALCULI IN THE DOG: A RÉSUMÉ.

By FRED. C. MAHON, M.R.C.V.S.

Southampton.

THE URINE OF THE DOG.

Is there anything which can go to prove a tendency owing to hæmal or chemical changes, bacterial invasion, or, indirectly, mode of living, properties in food and chemical changes to bring about the formation of renal or cystic calculi in dogs. Many cases occur in this animal, oft unsuspected during life, yet found on making *post-mortem* examinations? During the past year I have had four marked instances, but select the following to illustrate my point.

History.—My patient was a field spaniel, aged 3 years. He had only been a few weeks in his owner's care, but from the first day was noticed to have difficulty at times to micturate freely or naturally, to pass blood occasionally, have a capricious appetite, to shiver inordinately, straggling gait at times, fickle—if one can call it so—behaviour, being excited one moment, morose the next. Some three weeks after purchase my services were requisitioned and I was asked for a diagnosis. After careful examination of the penis, testicles, passing of catheter, rectal examination, &c., I diagnosed cystic calculi, and favoured, however, renal trouble—ulceration of kidney (pelvis) of some time standing—and calculi. *Post-mortem* examination showed no renal calculi, but an ulcerated bladder, both kidneys intensely inflamed, with sixty-three calculi of various sizes, shape, and colouring. A rough sketch of a few promiscuously chosen will serve to illustrate the case more forcibly.

Furthermore, the gastro-intestinal omentum showed intense inflammation. The lining membrane of the gastro-intestinal tract was remarkably free from congestion, as one would expect.

There was hæmorrhagic effusion into abdominal cavity, heart soft, and a few hæmorrhagic infarcts to be seen, with serous effusion into the pericardial sac.

The bladder was ruptured for about $1\frac{1}{2}$ in., edges jagged, dark coloured, and several pyramidal-shaped calculi driven together and protruded through the muscles of the bladder, and serous coverings into the abdominal cavity.

On carefully dissecting the penis the following salient lesions were shown: A few inches from the prepuce marked ulceration of the urethra, with enlargement and ulceration of the prostate glands, and commencing ulceration of the "os penis." The testicles were apparently healthy.

Reviewing diseases of the urino-genital system, may I allude to (1) cystic calculi; (2) renal; (3) pyelitis (inflammation of the bladder); (4) pustular erosions in urethra, glans penis, kidneys of the dog. This brings one to a wide sphere, where scope is given one to reason as to the causation of the many ailments peculiar to the dog. His life-history tends to produce so many of these conditions, and the facilities afforded by climatic changes, dirt, connection with bitches suffering often from venereal diseases render him, with the cat, the most subject to diseases affecting the organs above enumerated.

Bacterial Invasion.—I take as my standpoint as regards microbic mischief the part played by *Bacillus coli*, ordinarily a normal inhabitant of the intestinal canal of the dog, and the grave possibilities of its taking on a virulent stage due to climatic, dietetic, and other changes.

For example, take inflammation of the kidneys, and the deposit very often as a sequel of gravel; the urine tinged with blood, with mucus accompanying the same, access of the *B. coli* from ulceration of the parts, and its subsequent entrance into the circulatory system. Would not these conditions start the formation of calculi in the pelvis of the kidney, descend into the bladder, and afford the results I found to a marked extent in my spaniel patient?

CYSTIC CALCULI.

These may and are undoubtedly caused by the use of hard water (or water containing lime) for drinking purposes, especially where an animal as the horse is worked for hours at a stretch, and not given an opportunity to urinate. This pertains to the horse. Relative to the dog, he has access to everything and anything, and fortunately escapes by virtue, not of anything

peculiar in his digestive or urinary apparatus, but by organisms minimizing or neutralizing the germs he swallows when drinking from polluted streams, &c.

THERAPEUTICS. VACCINE.

Therapeutic opportunities for gonococcus vaccine arise when dealing with cystic, renal, and genital diseases of the dog and bitch, especially in cases of staphylococcus invasion of the urinary tract. This was instanced by Wright (*Proc. Roy. Soc. Med.*), "Vaccine Therapy Debate," 1910, vol. iii, where he favoured an association between this infection and calculus formations in the human subject, with the suggestion advanced by Walters in the same volume to the effect that the lowered resistance to staphylococcus manifests itself in diabetes by the tendency to carbuncle, &c., which may rather be a cause than a result of diabetes.

Beside the cystic calculi in the case of the spaniel, I found four in the urethral canal *post mortem*, very sharp edges to triangular-shaped formations, and which, injuring the urethral membrane, caused the discharge with urine of the blood noticed by owner and myself. As regards treatment, death resulted so quickly that I used but few, but had opportunity of giving several doses of adrenalin, both hypodermically and by the mouth.

The dog's appetite was gone, a haggard appearance, straggling gait, marasmus rapid, and death on fourth day after entering the infirmary. Milk, beef-tea, peptone elixir, brandy, all failed to rouse my patient, whom I foresaw from the first examination had no possible chance of recovery.

Before concluding my case, I may add I made inquiries relative to the dog's past history from his breeder and final owner as to any particular disease or injury encountered, but they stated that he was a strong, healthy animal, and commenced from an unknown cause to fail suddenly.

My opinion privately is that, being a good specimen, he was put to stud purposes too frequently, and following a severe chill, nervo-muscular exhaustion, the disease of the penis may have started the complaint, and propagated from the invasion of bacteria to the bladder and kidneys, bringing about the marked pathological changes noted.

The subject to be thrashed out would fill a volume, but no

more interesting cases are to be found in the diseases of the dog or require more careful thought, care in handling and mixed therapeutic and vaccine treatment than those of the renal, cystic, and generative organs in both the dog and bitch.

In conclusion, may I again add the long-standing lesions, the newly formed ulcerations of the urethra, the commencing necrosis of the "os penis" appear to convince one that the whole trouble arose from the penis and travelled upwards in this case, and that the renal conditions were only sequelæ?

Unfortunately, want of time and facilities for investigation are lacking in dog practice to very many, but I venture to add we know but little truly of many ailments of the dog; in fact, are only just commencing, as it were, to touch upon diseases unknown and unrecognized hitherto.

See *Veterinary Notes*, January, 1916, and William Scott, F.R.C.V.S., of Bridgwater, "The *Bacillus coli communis* in Veterinary Practice." He says:—

"One can easily understand the prominent part the *B. coli* would take in diseases of the kidneys. They are often the seat of *B. coli* invasions. In the female, particularly after parturition, the infection is urogenic in origin, and this point is rather substantiated by the fact: in practice one seldom gets specific bacterial invasions of the kidneys in the male, unless they are of haematogenic origin. Colon vaccine is now being tried for metritis, renal, cystic, and urethral affections, also in enteritis, in which disease in the horse and dog I trust at a future date to record my experiences, and vaccine treatment, as I hold strongly that *B. coli* and other organisms are the cause of enteritis in the majority of cases."

THERAPEUTICS.

Both in human subjects and in canine practice, "Piperazaine" (Burroughs, Wellcome and Co.), 5 gr., tabloid form, to be given after a meal has been tried with marked success. It is claimed that this drug acts as a depressant in some cases, therefore it is advocated, and I generally use 2-gr. doses at first, and gradually increase to 5 gr. It is further claimed for this agent that it is believed to be a stronger solvent of uric acid than any salt of lithium.

For the latter drug it is believed that its administration forms

soluble urates, therefore it plays a great part in human medicine, and especially in gout and uric acid calculus. I have used this alternated with adrenalin in old patients suffering from incontinence of urine and sabulous deposits in the same, with amelioration of the graver symptoms.

Potassium citrate is also strongly recommended for patients suffering from bloody urine with uric acid deposits, and should be useful in canine practice.

In many cases of sabulous deposits in the bladder mineral acids, as nitro-hydrochloric acid dilutum, in my experience afforded relief and prolonged life materially.

Selected Article.

A STANDARD METHOD OF TESTING ANTISEPTICS FOR WOUNDS, WITH SOME RESULTS.

By W. D'ESTE EMERY, M.D.LOND., M.R.C.S.ENG., L.R.C.P.LOND.

Captain, R.A.M.C. (T.F.); Director of the Laboratories, King's College Hospital.

ONE of the most astonishing medical facts in connection with the War is that there is no sort of agreement as to the best method of treating septic wounds. Are we to use antiseptics at all? And if so, what antiseptic? An impartial observer might come to the conclusion that the best treatment depended on the locality. In France, he might say, wounds do best without any antiseptic at all; in England, especially in the Midlands, Dakin's antiseptic is the best; whereas, when we cross the Tweed, there is nothing to compare with eusol. The fact is, of course, that good results are obtained by all methods (why this is the case I shall discuss in a subsequent paper), and that the skill of the surgeon is of much greater importance than the particular form of lotion he happens to be enamoured of for the moment. I think we may lay down the general proposition that if a wound is properly cleansed and properly drained at a sufficiently early period, there ought to be *no* deaths from sepsis. I am speaking exclusively of wounds as I have seen them in France. But this does not absolve us from the duty of testing all methods of treatment which may be applied subsequently to this surgical toilet of the wound, for some may give us quicker and more

painless results than others, and may be easier of application in unskilled hands—a point of considerable importance under conditions such as obtain at present. It behoves us, therefore, to study very carefully all the processes which go on in a wound, and, in particular, the effects of the substances which we propose to apply thereto; and to study them, not only in relation to their action on the bacteria in the wound, but also on the cells and juices of the body itself. The latter is a matter of great difficulty, and I defer its consideration for the present.

It would appear obvious that the first essential in the study of antiseptics for this purpose would be a determination of the relative (and, if possible, absolute) potencies of the various substances which are in use, and it is very surprising to find that this has not been done. Thus I find in a recent paper the carbolic coefficient of a certain antiseptic is solemnly quoted as affording evidence of its value in wounds! Applying this test, we should be led to the belief that perchloride of mercury would sterilize wounds or the secretions from them at a dilution of 1 in 15,000 or thereabouts, whereas it is actually efficacious in a dilution about 100 times less. The carbolic acid coefficient may have a commercial value, but it has no other. More recent writers have tested the action of their antiseptic on bacteria suspended in serum. This is much better, but it is still not good enough. I know of no condition which occurs in surgical practice in which the problem is to sterilize blood serum.

In the early stage of a wound it is filled with blood and blood-clot; in the later it is filled with pus. Obviously, therefore, we should test the action of antiseptics on these substances. Now pus is a very undesirable substance to test in this way for several reasons. In the first place, there is no uniformity in its composition, either as regards the substances in solution or as regards the number of cells. And, more important, the number and nature of the organisms vary enormously, so enormously as to deprive our results of any value whatever. For example, pus containing streptococci only may be completely sterilized when mixed with an equal volume of 1 in 60 carbolic for fifteen minutes, whereas if the spores of *B. perfringens* are present (as is usually the case) they are not necessarily killed when the pus is mixed with equal volumes of 1 in 20 carbolic and incubated at the body temperature for two days. I suggest, therefore, that unless we

can find a method of preparing pus of standard composition, and containing a standard number of bacteria, we should abandon this method of testing antiseptics.

Blood presents no such difficulties. It is always at hand and always reasonably constant in composition, and we can add to it what bacteria we like and in the proportions we like. Moreover, it is the actual substance that we have to deal with if we attempt to sterilize a wound in the earlier stages. Blood therefore appears ideal for the purpose.

In actual practice we have to prepare the blood so that it does not clot. We may use citrated blood, using the smallest amount of citrate possible so as to avoid excessive dilution, but this method fails us if we have to deal with antiseptics containing calcium salts, for these will bring about coagulation in our citrated blood. A better method, though one that is a little more troublesome, is to use "reconstituted blood," made by adding equal amounts of serum and of washed corpuscles. It is prepared as follows: Collect some blood from the finger in a Wright's capsule and allow it to clot. Collect about the same amount of blood, allowing it to drop into citrated saline; centrifugalize; decant off the clear fluid; add normal saline, stir, and centrifugalize again; again pipette off the supernatant fluid and replace it by serum in amount equal to the deposit of corpuscles, and stir. This will give you a fluid almost identical with blood, except that it is uncoagulable.

As regards the organism to be added, for general purposes *Streptococcus faecalis* (or the enterococcus) is all that can be desired. It is our chief enemy in wounds; it can always be obtained without any difficulty in pure culture; it grows rapidly, so that the results of tests made in the morning can be read off in the evening; and, as a small but important practical point, it readily emulsifies, so that there are no masses to resist the action of the antiseptic. Of course, for other purposes other cultures may be used. The inventor of a new antiseptic might prefer to use *B. coli* or *B. typhosus*, which are much more easily killed, whereas the opponents of all antiseptics might use the spores of *B. subtilis*, and find that it was almost impossible to kill them by any antiseptic; and justify his action by showing that they were very common early infections of wounds. But the streptococcus is sufficient for all ordinary purposes.

Next, as regards the number of these bacteria. This is a point of very considerable importance, and one that calls for some theoretical consideration. The death of a bacterial cell might be considered as being due to the combination of a certain number of molecules of the antiseptic with the protoplasm of the cell; and hence it might be argued that the amount of antiseptic required would be proportionate to the number of bacteria, supposing, of course, that they are suspended in an inert fluid. This is incorrect, for the reason that all bacteria in an apparently homogeneous culture are not alike. Some, perhaps, have just divided, and have not formed a protective cell-wall; others, *pace* Weismann, are decrepit from old age; whilst still others are as strong and resistant as it is possible for a bacterium to be. Hence, if we test our antiseptics on a small amount of culture, we shall get varying results according to the condition of the microbes that we happen to take. We can overcome the difficulty in two ways: by using large volumes of the mixture to be tested or by making a relatively heavy inoculation of the blood we are going to use as our test fluid. This is the more convenient method, and in order to take a definite figure I have used throughout a mixture of 9 parts of blood and 1 part of an 18-hour culture of streptococcus, containing about 250,000,000 cocci per c.c. It would perhaps be a little more accurate to count the culture before use, and to add a definite number, but if the same culture is inoculated in the same way into the same amount of standard broth the results are very constant, and with the large implantation given small variations are not of much effect. This is one of the advantages of a heavy implantation, such as I recommend.

The next question concerns the time during which the antiseptic should be allowed to act. This brings us to a point of the greatest importance, but one, I think, that has hardly been adequately dealt with. All antiseptics combine with proteins in solution, or with cells, and hence bacteria lying in pus or blood are shielded from their action. This is recognized as the "quenching" action of these fluids, and it is well recognized that the effect is much greater with different antiseptics; mercury salts, for example, are quenched to an enormous extent, carbolic acid relatively but little. But this is not the whole story. The mixtures of some antiseptics and blood will become an unfavour-

able culture medium for bacteria, or the compound of the antiseptic and the protein will dissociate, giving a slow but continuous anti-septic action, such as is desired by some surgeons, and referred to as a "depôt-action." With other antiseptics this is not the case, and the antiseptic is either completely destroyed or, at least, rendered inert by combination with protein. Hence, if we test the former on infected blood, making a mixture that is not completely sterilized in a certain period of time, say fifteen minutes, and then re-test from time to time, we shall find the number of bacteria will steadily fall off. With the second group, on the other hand, there will be a transitory fall in the number of bacteria, after which they will grow, perhaps not so well as before, but under some conditions much better. Carbolic acid is an example of the first class, eusol of the second. For example, a mixture of carbolic acid and infected blood which is just not sterilized in a quarter of an hour will be completely so in one hour, whereas a mixture of eusol (undiluted) and infected blood in equal parts will show some diminution in the number of bacteria if tested after a quarter of an hour, whereas if it is re-tested after one hour abundant growth will have taken place, and it will be indistinguishable from the control. I know this will appear a hard saying to many, but I have no doubt as to its correctness; the addition of eusol in amount insufficient to cause complete destruction of the microbes has no appreciable deleterious effect on the fluid as a culture medium for what remain. I advise, therefore, that the effect of the antiseptic shall be tested after two periods of exposure, and for all practicable purposes these may be fifteen minutes and sixty minutes. It might be a good plan to add a third, two hours.

As regards the temperature of exposure there can be no difference of opinion. The mixture of antiseptic and infected blood must be incubated at the temperature of the body, the temperature at which they are to be used in practice.

Lastly, what criterion of killing are we to adopt? There is a general idea that the planting-out subsequently to the exposure to the antiseptic must be done in a large quantity of broth, so that any antiseptic may be diluted to such an extent that it ceases to act. I think this is a theoretical point only, and the method quite unnecessary in actual practice; and it has the great objection that it only tells us whether there is or is not complete sterilization of our test-fluid. If, on the other hand, we plate out on agar

and count the colonies that grow up we can tell what dilution of antiseptic will cause partial sterilization, and what complete; and, moreover, it avoids the possible fallacy that a single microbe which had accidentally escaped contact with the antiseptic might vitiate our results. The theoretical objection to this method does not take into consideration the fact that most—as far as I know, all—antiseptics diffuse well through agar, so that it is not correct to argue that when a mixture such as I have described is plated out the antiseptic continues to act on the microbes for an indefinite period; it diffuses rapidly away into the substance of the agar, the microbe remaining on the surface. As a matter of fact, I have made parallel observations with the two methods, and have got in most cases absolutely identical results.

The technique I have used is quick and easy. The requisites are: (1) Infected blood, prepared as described above; (2) the antiseptic to be tested, in suitable dilutions; (3) a stock of capillary pipettes, such as are used in the opsonin technique; (4) large agar-plates, deep, so as to allow diffusion of the antiseptic, and surface dry; (5) a standard platinum loop about 2 mm. in diameter; and (6) some slides which, when sterilized by flaming, are used to prepare our mixtures on.

The process is as follows: Fit an india-rubber teat to one of the pipettes, and make a grease-pencil mark on the latter about 2 in. from the tip. Then take one volume of infected blood and one volume of antiseptic and mix thoroughly on the sterile slide. Suck back about half into the pipette and seal. Take the other half into another pipette and seal it also. Place the two pipettes in the incubator, noting the time (an opsonin incubator is a great advantage). Repeat the process with the other dilutions of antiseptic, making in each case a mixture of equal parts of antiseptic and infected blood. At the end of a quarter of an hour remove the first of your dilutions, fit on an india-rubber teat, and cut off the tip of the pipette. Sterilize the end lightly in the flame, and expel the contents of the pipette on to a sterile slide, and mix thoroughly. Now take a loopful, avoiding bubbles, with the platinum loop, and spread it out over as large a surface as possible on the agar plate. Repeat this with the other dilutions when their fifteen minutes' incubation is up, and with the second series after an hour has elapsed. Incubate the plates; growth is complete in twenty-four hours, but the results can be read off before then.

I append some of my results:—

Antiseptic	15 minutes		60 minutes	
	Does not kill	Kills	Does not kill	Kills
Carbolic acid	1 in 70	1 in 60	1 in 60	1 in 50
Eusol	Undiluted	—	Undiluted	—
Dakin	“	—	“	—
Perchloride	1 in 100	1 in 80	1 in 100	1 in 80
Biniodide	1 in 60	1 in 40	1 in 60	1 in 40
Iodine	1 in 100	?	1 in 100	?
Lysol	1 in 40	1 in 30	1 in 150	1 in 120
Malachite green	1 in 250	1 in 200	1 in 250	1 in 200

The expression "does not kill" may be taken in most cases as implying that it causes a diminution in the number of organisms, but does not effect actual sterilization; this dilution, therefore, may be taken as a convenient end-point if various antiseptics have to be compared. For instance, there is a tradition that eusol and Dakin's solution are several times more powerful than carbolic acid, whereas, as a matter of fact, it is seen when this method of testing is used that these substances undiluted (0·5) are about equal in effect to a 1 in 70 dilution of carbolic—in other words, carbolic acid is seventy times as strong. But this is only if they are tested at the end of a quarter of an hour; if tested at the end of one hour the chlorine preparations appear to be quite inert, the surviving bacteria having grown until, unless special methods of plating are used, they appear as abundant as in the controls. To demonstrate complete killing with eusol it is necessary to have approximately two volumes of the antiseptic to one of blood.

The killing point of iodine is not given. It is about 1 in 60, but at a dilution like this the blood is turned into a thick pasty mass, very unsuited for accurate work. Iodine is sometimes used in a dilution of 1 in 300 or 400 to "sterilize" wounds. Such a dilution is quite inert.

The results with malachite green may excite surprise; it is by far the most powerful antiseptic that I have investigated. Unfortunately, its action on the living cells is even more powerful, otherwise it would be the ideal antiseptic for surgical use.

This work was carried out for the Medical Research Committee, to whom my best thanks are due.—*Lancet.*

Abstract.

TUBERCULOSIS IN THE DOG AND CAT.*

By W. REID BLAIR, D.V.Sc.

New York City.

VETERINARIANS, as a rule, have looked upon tuberculosis in the dog, until a comparatively recent date, as an unknown or exceedingly rare disease. So many cases have come under my observation during the past few years, that I feel I have heretofore been overlooking the condition. During the past few years a considerable amount of literature has appeared on tuberculosis of the dog and cat. It is principally due to the work of Eber, Jensen, Cadiot, Douville, Hebrant and Antoine that this disease in the dog has been placed on a firm basis. Being particularly interested in tuberculosis from a comparative standpoint, I have taken every opportunity to discuss the subject with the men whom I knew had investigated the disease to a considerable extent, and I was able to get much information from the study of pathological specimens, and from statistics of the Small Animal Clinic at Berlin under Professor Regenbogen. Also from Professor Eber, the famous tuberculosis expert, and Director of the Veterinary Institute Laboratories at Leipzig, whose work for a number of years has been on the relationship of the various types of tubercle bacilli. It may be of interest to mention in this connection that Professor Eber has repeatedly shown that it is possible to so alter the human type of tubercle bacillus, by systematic passage through animals, that, with the means at present at our disposal, they cannot be distinguished from bacilli of the bovine type. His researches furnish abundant evidence that the two types of tubercle bacilli, the human and the bovine, are not types of sub-species with constant characters, but rather varieties of one and the same bacillus, with relatively variable characters. He recognizes that the bacilli cultivated directly from the human or bovine sources possess certain biological characteristics which permit of a distinction in the majority of cases between the human and bovine types.

In his experimental work in carrying the human type tubercle bacillus through guinea-pigs, calves and cattle, Professor Eber

* Read at the meeting of the New York State Veterinary Medical Society, Ithaca, New York, 1915.

succeeded repeatedly in changing the morphological characters of the human bacillus to that of the bovine type.

This work of Professor Eber is splendidly demonstrated by means of gross pathological specimens showing the lesions through the successive stages.

In Brussels, and again in Paris, I learned that tuberculosis in dogs was not an uncommon disease, many cases having been apparently traced to ingestion of food contaminated in cafés and restaurants by sputum from tuberculous subjects.

Dr. Winchester, of Lawrence, Mass., who has been for many years especially interested in tuberculosis, recently told me of several cases of tuberculosis in domestic cats which had come under his observation.

In two instances the cats made their homes in cafés, and their food was principally what they picked up from the floor, consisting of scraps of cheese, bread and meat, material which was doubtlessly contaminated with sputum from tuberculous frequenters of such places.

In certain parts of Switzerland also the disease among dogs is frequently seen. This is doubtless owing to the high percentage of tuberculosis in these localities and the opportunity for infection afforded by allowing animals raw meat or offal, or unboiled milk from tuberculous animals. It is not strange that the disease is prevalent under such conditions.

Two papers have recently appeared which have thrown much light on this disease as affecting the dog and cat. One of these by a Frenchman, Professor Douville, entitled "Tuberculosis of Domestic Carnivora," the other by Professors Hebrant and Antoine on "Tuberculosis of the Dog and Cat."

Professor Douville places the relative frequency of the disease in the dog at about 4 to 4½ per cent., these statistics being based on 20,000 animals examined when alive or after *post-mortem*. In cats the frequency is placed at about 1 per cent.

Professors Hebrant and Antoine, taking the number of animals they have treated as a base, place the relative frequency of tuberculosis at 16 per cent. in the dog, and about 7 per cent. in the cat.

The disease is more frequently seen in cities than in country districts, and I believe this is due to the fact that in a large percentage of cases of tuberculosis in dogs infection is from human sources.

It is generally held by those who have made a careful study of tuberculosis in the dog that the source of infection is nearly always from human origin.

In several of my cases the bacilli were demonstrated to be of the human type. With a single exception all the dogs and cats which I have examined, and recorded particulars of in this paper, were house pets, and in the case of three dogs and one cat, the owners of the animals, I believe, were suffering from some form of tuberculosis, generally pulmonary. The disease is contracted principally by ingestion, and possibly by inhalation, especially in the pure pulmonary form of the affection.

SYMPTOMS.

The disease, as a rule, runs a chronic course, but occasionally it may assume an acute form.

It generally runs a silent course for some time, then suddenly manifests signs of effusion into the thoracic or abdominal cavities. At other times these effusions follow a chronic cough or as a result of pressure of swollen lymphatic glands in the region of the throat or neck.

In some instances there is an occasional short cough, which may increase and continue for several weeks, or even months. The animal gradually becomes miserably thin and wastes visibly from week to week. The soft parts of the scapula and dorsal region become shrunken, allowing the bony parts to stand out prominently, the flanks seem to be slightly fallen in, and the abdomen appears pendulous. The mucous membranes are pale and the facial expression is dull and stupid. The coat is dull and erect, giving the animal an unthrifty appearance, and it seems to tire on slight exertion. There is usually a steady loss of condition, while the appetite generally remains good. Later, when the lungs become extensively involved, there is a dry, hoarse cough, which may be induced by making the animal get up and move about. After a time this cough may become more frequent and looser, and during the effort of coughing a mucopurulent discharge may be ejected from the mouth.

When the pleura is affected the respiration becomes difficult, short and sharp, and very often accompanied by moaning and groaning at each respiratory movement. If there is much fluid in the pleural cavity the flanks heave or have a pumping-like action, accompanied by ballooning of the cheeks. When the liver

is involved a slight icteric condition of the visible mucous membranes is seen. Palpation will detect enlargement of this organ, nodules on its surface, and abdominal effusion.

The bowels are very irregular, alternating between constipation and diarrhoea, the diarrhoeal discharge often containing blood-stained mucus.

The temperature is very irregular and oscillating, varying from day to day, and during the twenty-four hours from 102° to 104° F. Occasionally it will be subnormal. As the disease progresses the cough and emaciation progress, the appetite becomes very capricious, and the animal presents a sorry sight. The slightest exertion gives it great distress. Fainting spells are common at this stage, and are brought on by slight exertion or excitement. Excessive thirst and polyuria are prominent symptoms.

In some cases tuberculous dogs may live for many months without showing great disturbance, while in other cases death is quickly brought about by exposure, resulting in pneumonia.

Aspirating the fluid from the abdominal cavity gives only temporary relief, making it necessary to repeat the operation at intervals of a week to ten days. The fluid obtained is nearly always blood-stained, and quickly solidifies on exposure to the air.

LESIONS OF TUBERCULOSIS.

The lesions of tuberculosis are found affecting almost all of the organs of the thoracic and abdominal cavities, but the organs most frequently affected appear to be the lungs, pleura, lymphatic glands of the thoracic region, and the liver.

The lung tubercles are generally of a greyish colour and of a fibrous consistency. They may undergo softening, and then the centres of the tubercles contain pus. In some cases typical miliary tubercles, resembling the same type of the disease in the human, are seen, the lesions being scattered throughout the substance of both lungs.

The lymphatic glands, especially the bronchial and mediastinal, are generally enlarged whenever the thoracic cavity is involved. Sometimes these glands are enlarged to such an extent as to give rise to the opinion that they are new growths, and they have doubtless been mistaken for sarcoma.

The glands are sometimes firm or fibrous in consistence, but

they more frequently undergo softening in the centre, and on section show a sticky yellowish or milky fluid, or a cheesy mass.

The pleural cavity frequently contains a large quantity of amber-coloured serous fluid. The lesions on the pleura consist of thickening with large irregular masses, having on their surface firm granulations resembling miliary tubercles found elsewhere.

The pericardium shows similar lesions, and the pericardial sac may contain a considerable quantity of blood-stained serous fluid.

The intestines show ulcerative lesions, and the mesenteric glands are generally enlarged when the intestine is involved.

The abdominal cavity may contain several quarts of yellowish blood-stained fluid. The peritoneum shows typical miliary tubercles resembling the pearly lesions so often found in tuberculosis of cattle.

The liver, next to the lungs, is most frequently the seat of tuberculosis. The tubercles here are greyish or whitish in appearance, fibrous and firm, and vary in size from that of a pea to an orange. Some bulging out on the surface to such an extent that no difficulty is experienced in detecting them on palpation.

The kidneys show various sized tubercular masses generally confined to the cortex. In the cat, tuberculosis is most frequently seen in the kidney, and I have seen the structure of one kidney entirely replaced by a tubercular mass.

Case No. 1.--Cocker spaniel, male, 4 years old. Had been for the past three years the constant companion of his owner, who was suffering from pulmonary tuberculosis, and was, at the time of the animal's death, an inmate of the Seton Home for Consumptives in New York City.

When the dog was examined it was suffering from pneumonia, pleurisy, and ascites. Was in fair condition of flesh, but appeared much older than four years. The dog died two days later, and an autopsy showed extensive generalized tuberculosis. The lungs were greatly congested and showed chronic caseated tubercles: the heart and pericardium, extensive tubercular deposits, with adhesions to the lungs and myocardium. There was about three quarts of bloody serous fluid in the thorax. The pleura showed numerous small miliary tubercles. The anterior mediastinal lymph gland was greatly enlarged, and showed numerous areas of softening.

The liver was greatly enlarged and covered with small miliary

tubercles. There was a great amount of fluid in the abdominal cavity. The spleen was normal. The mesenteric lymph glands were enlarged and oedematous. The right kidney showed several tubercular foci about $\frac{1}{2}$ in. in diameter. The diseased organs were placed at the disposal of Dr. Park, of the New York Health Department, who demonstrated the tubercle bacilli in the lesions from the different organs to be of the human type.

Case No. 2.—English bull, male, 2 years 11 months old, owned by Mr. S., N.Y. City. In good health the dog weighed 55 lb., and was very active.

Early in April he got into a fight, and after the owner



Case No. 2.

separated them he collapsed (fainted), and voided urine involuntarily.

On May 4 he served a bitch, and from that time on started to lose weight, and as the thinness became noticeable, the owner suspected the dog had worms and treated for them, but none were found.

On June 24 I saw the dog for the first time. There was a well-marked broncho-pneumonia present with considerable pleurisy. With treatment the dog made a seemingly good recovery, but convalescence was slow. Several weeks later I was called again, the owner giving me a history of fainting

spells on slight excitement, the appetite normal in every respect. Examined faeces; no ova of parasites were found. Blood smears showed extreme anaemia, no ova of *Filaria immitis* were found, although I suspected these worms on account of the frequent fainting spells. The lungs were congested, pulse irregular and rapid. Dog again showed improvement after administration of strychnine, iron and arsenic. For several weeks showed some improvement in spirits, but none in flesh. Liver was larger than normal, as well as spleen. Spleen being enlarged, I suspected leukæmia, but the blood examination did not assist in this opinion. Showed case at Brooklyn, at State meeting, for examination. No diagnosis was made. Dr. Mangan detected the irregular heart. Early in November again saw the dog, and he had emaciated greatly. Had no difficulty in feeling nodules on spleen and liver. Called Dr. Mangan in consultation, telling him that I suspected tuberculosis. On November 7 the animal was photographed and destroyed.

Autopsy Summary. Case No. 2.—Animal: English bull-dog. Source: Mr. ——. Date of death: November 7. Date of autopsy: November 7.

Anatomical Diagnosis.—External lesions: Greatly emaciated, enlarged liver and spleen, probably tuberculous.

Brain and spinal cord: Not examined.

Heart: Very flabby; endocarditis.

Lungs: Right congested, fibrous and miliary tubercles scattered uniformly throughout; bronchial and mediastinal lymph glands enlarged and cased. Left glands greatly enlarged, caseous.

Liver: Greatly enlarged, large tubercular masses 1×2 , $3 \times 4\frac{1}{2}$, 5 lb.

Kidneys: Right, several miliary tubercles. Left, several miliary tubercles.

Spleen and lymph nodes: Slightly enlarged, few miliary tubercles.

Pancreas: Normal.

Stomach: Catarrhal.

Small intestine: Miliary tubercles and ulcerated patches.

Large intestines: Miliary tubercles.

Genito-urinary tract: Normal.

Cause of death: Generalized tuberculosis.

Microscopic examination of lungs, liver, heart, kidney and spleen showed tubercular lesions.

Microscopical Examination of Case No. 2.—Lungs: Numerous large and miliary tubercular foci with much new-formed fibrous tissue, other tubercles caseous. Interstitial tissue greatly increased.

Liver: Blood-vessels congested, much inflammatory tissue surrounding large necrotic area. Extreme fatty degeneration of cells of liver.



Case No. 3. Dog alive.

Heart: Shows extreme fatty changes of muscle fibres.

Lymph glands: Necrotic masses and softening, congestion.

Spleen: Congested.

Kidney: Shows degenerated tubercles in cortical portion; chronic nephritis.

Case No. 3.—Bull-terrier, male, 3 years old, had been treated for bronchitis for several weeks, apparently without improvement; appetite good. When presented to me animal showed emaciation, laboured breathing, temperature 103° F. Anæmia. On palpation

I was able to detect nodules on the liver without difficulty. Advised destruction of animal, owner consenting. Autopsy showed generalized tuberculosis, with lesions showing in lungs, pericardium, bronchial lymph nodes, liver, spleen, kidneys. Photographs here shown were made on the same day of the autopsy.

Case No. 4.—Fox-terrier, male. Case examined for Dr. R., of New York City. History of several attacks of bronchopneumonia, ascites, chronic cough, gradual emaciation during period of several months. Autopsy showed typical tubercular lesions of the liver, kidney, spleen and mesenteric lymph nodes.

Case No. 5.—Fox terrier, male, 6 years old. No good history.



Case No. 3. Same dog, dead.

except unthriftiness for long time. Autopsy : tuberculosis of liver and kidney, very extensive.

Case No. 6.—A very large brindle bull-dog, male, owned by Mrs. F., of New York City. This animal was 9 years old, very fat. Was consulted in May on account of the animal having a chronic cough, occasional diarrhoea, and easily fatigued on slight exertion. Temperature 103° F., rapid respiration, heart irregularly intermittent. Mucous membranes pale. Examined stools for parasites; negative. Gave codeine for the cough, and regulated diet, eliminating all starch substances which formerly made up the principal diet. From May until September did not see this dog again, but when I was called in early in September found a very greatly emaciated animal with a history of chronic

cough, and fainting spells brought on by the animal going up two flights of stairs. Anæmia and jaundice marked, pronounced pleurisy and bronchitis. Found nodules on the surface of the liver, diagnosed tuberculosis, and advised chloroform. The owner did not consent to this, but wished the animal to die a natural death. About two weeks later the owner telephoned, wishing the animal chloroformed, but before I could reach the house the dog had died.

Case No. 7.—French bull-terrier, male, aged 12 years, owned by Mr. S., of New York City, a very healthy, well-nourished, active animal, suddenly developed asthmatic symptoms and ascites. Two quarts of blood-stained serum were taken from abdomen which seemed to give relief for about four weeks, when the dog was again returned on account of excessive fluid in the abdomen. The owner was advised that it was useless to treat the animal, but on account of sentiment refused to have it destroyed, and insisted upon treatment as long as the animal would live without apparent distress.

At intervals of about ten days a large amount of fluid was taken from the animal's abdomen. From the second tapping the dog showed progressive emaciation, and finally, after several months, I was able by palpation to detect the nodules on the surface of the liver. The dog finally died from asphyxiation due to acute oedema of the lungs. The autopsy showed generalized lymphatic tuberculosis.

Case No. 8.—Aged Great Dane, male, with a history of chronic cough, emaciation, irregular temperature, and occasional fainting spells on slight excitement. Pleural and abdominal effusion, and finally death from oedema of the lungs. I was unable to autopsy this animal, owing to my absence from the city at the time of the sudden death.

Case No. 9.—French poodle, 6 years old, female, had been in poor condition for several months. Suffered from occasional diarrhoea but as microscopical examination of the faeces showed that animal was infested with whip-worms, the diarrhoeal condition was attributed to these parasites. The animal, after a full meal on a very hot day, had been let out in an exercising field, had a convulsion, and died without gaining consciousness, considerable blood coming from the nostrils.

The autopsy showed death to be due to acute dilatation of

the heart as a result of acute indigestion. The following condition of tuberculosis was found:—

The pleura showed very extensive thickening with a great many pearly-like tubercles scattered throughout the surface. The pericardium was also thickened and tubercles numerous. The lungs were congested and oedematous, and contained many tubercles with numerous irregular-shaped cavities, varying in size from $\frac{1}{8}$ in. to $\frac{1}{2}$ in. in diameter. The cavities were generally collapsed and were lined with necrotic tissue, which had a dirty greyish oily appearance. The bronchial and mediastinal lymph glands were enlarged and showed areas of softening. The liver was congested but not tubercular. The spleen showed four tubercles about the size of a pea on the surface of the organ. These were not close together.

The kidneys were congested, but no tubercles were found. The mesenteric lymph nodes were enlarged, reddish in appearance, and oedematous on section. None showed any necrosis. The intestines showed numerous whip-worms, but no evidence of tubercular ulceration.

Treatment.—The treatment is useless, and when a diagnosis has positively been made, humane destruction is the only thing to be advised. I consider a tuberculous dog, on account of the generally close association with its owner, a very dangerous animal to have about the home, especially if there are young children in the family.

DIAGNOSIS AND CONCLUSIONS.

I have never made a positive diagnosis of canine tuberculosis except in the advanced stages of the disease. In the last two or three cases the disease had reached the stage of great emaciation when I first saw them, and in these instances palpation of the abdominal organs was a comparatively simple matter. I understand that tuberculin has been used to some extent for diagnosis of this condition in dogs, but in all the cases coming under my observation the animals exhibited very irregular temperatures, frequently several degrees of fever, and the use of tuberculin, it seemed to me, would not lead to any reliable conclusion.

Douville's conclusion upon the result of tuberculin as a diagnostic agent may be summarized as follows: After the injection of 8/10 to 1 $\frac{1}{2}$ c.c. of tuberculin, the dose depending on the size of the dog, you may get a reaction from the fifth to the eighth hour.

If after subcutaneous tuberculin the temperature should rise to 104° F. or above, the reaction should be considered as positive.

The injection of tuberculin fails in about 40 per cent. of cases. Sometimes it is dangerous, since it may intoxicate or be followed by death. In cats tuberculin is uncertain, or may be dangerous for animals free from the disease.

The history of cases of tuberculosis in dogs is most important. You will generally learn that the animal has had pneumonia or chronic bronchitis which has not yielded to treatment. The breathing has been rapid and laboured for a considerable time, and does not improve to any great extent while the animal is at rest. The owner cannot understand why the animal does not improve in condition in view of the fact that special attention has been paid to the diet, and considering the amount of nutritious food consumed.

The disease is more frequently seen in adult or aged dogs.

Except in one instance I have never met with tuberculosis in large kennels of dogs, where autopsies are a matter of routine.

In the domestic cat I have seen tubercular enteritis, with ulcerated patches, but generally the disease is of the lymphatic form, the mesenteric glands being generally implicated. These become enlarged, and it is not unusual for this enlargement to be felt by palpation through the abdominal walls.

The kidneys of the domestic cat seem to be often the seat of tubercular infection, and I have found a tubercular kidney three times the normal size.

Tuberculosis is not a rare disease among the larger carnivora, as the lion, tiger, leopard, and puma or mountain lion, when subjected to close confinement in menageries or travelling circuses. In these animals the disease generally assumes the lymphatic form, although I have seen cases of pure pulmonary tuberculosis, in which cavities in the lungs were found, which resembled the typical cavitations so frequently found in the human lungs.

I believe that the holding of autopsies upon our small domestic animals should be more frequent among veterinarians than is the practice at present, and, when we consider that there is rarely any objection raised to this procedure, we should realize that we are wasting much valuable material which would enable us to carry out a more scientific treatment if our diagnosis were only partially correct, which, by the way, is liable to occur in the best regulated practice.

It is always a satisfaction to the veterinarian, as well as to his client, to know as a result of the autopsy that the conditions found indicated the correctness of the diagnosis.—*Cornell Veterinarian.*

General Article.

INVESTIGATIONS INTO THE CAUSE OF WORM NODULES (*ONCHOCERCA GIBSONI*) IN CATTLE AT DARWIN, NORTHERN TERRITORY, AUS- TRALIA.

By J. F. McEACHRAN, M.R.C.V.S.

Chief Veterinary Officer.

AND

GERALD F. HILL, F.E.S.

Entomologist.

IN 1911 a paper on "*Onchocerca gibsoni*, the Cause of Worm Nodules in Cattle," by Drs. Gilruth and Sweet, was published by the Commonwealth Government, and in 1912 appeared a paper by the same investigators, published by the Royal Society of Victoria, entitled "Further Observations on *O. gibsoni*, the Cause of Worm Nodules in Cattle." The history of the occurrence of these parasites in Australia has been fully dealt with in the papers referred to, and also in reports by Drs. Cleland and Johnston, and published by the Bureau of Microbiology, Sydney, the Commonwealth Government, and in other places.

The worm nodules, the structure and general characters of the parasite, have been carefully described by these authors, and as their descriptions rarely conflict, they may be accepted as scientifically correct.

In the slaughter-house at the Dairy Darwin, and on the stations in the coastal belt of the Territory, ample opportunity has been given us of ascertaining the prevalence of worm nodules in the Northern Territory, and there is no doubt that the parasite is extremely prevalent. In the slaughter-house, practically every bullock and cow examined showed worm nodules in the brisket. All breeds of cattle show evidence of infection—the buffalo alone seems to be exempt, but, as little opportunity has been given us for *post-mortem* examination of these animals, we cannot speak authoritatively on this point. In six *post-mortem* examinations of buffalo in the vicinity of Darwin, no worm nodules were discovered, and very careful watch was made for them. Dr. Gilruth's conclusions respecting the practical absence of reinfection after a certain age, and the tendency of the nodule to become smaller, or finally disappear, have been confirmed. The wide prevalence of the parasite amongst the Northern Territory, and the apparent absence of them in buffalo, is very extraordinary, and would direct our attention to the possibility of an intermediary host which attacked cattle, but never or rarely attacked buffalo. The necessity for an intermediary host in the life-history of *O. gibsoni* is manifest, and it is quite unnecessary to reiterate or cogitate upon the conclusions of Drs. Gilruth and Sweet and Drs. Cleland and Johnston in this direction. Many possible intermediary hosts were mentioned, and much experimental work was accomplished,

but with negative results. No definite host could be decided upon, and further research was required. Evidence certainly pointed to a biting insect—a fly or a louse—as the carrying agent, and the Administrator (Dr. J. A. Gilruth) authorized us to conduct a series of experiments, suggested by him in 1912, the experimental cattle used to be young animals imported from Victoria, where worm nodules were rarely or never encountered amongst locally bred cattle. Towards the end of 1913 negotiations were entered into with the Department of Agriculture, Victoria, for six heifer calves about six months old, and bred in Victoria, to be sent to the Territory. They were tested with tuberculin and shipped in December, five arriving in the Territory on January 6. Unfortunately, one died on the voyage.

No special precautions were taken on board the steamer conveying the calves to the Territory, and there is every likelihood that each or all of them were bitten by *Stomoxys calcitrans*, mosquitoes, and, perhaps, *Tabanidae* whilst the steamer was moored at ports *en route*, and on the day of arrival in Darwin we had definite knowledge that they had been bitten by *S. calcitrans* and mosquitoes before and during transport to the laboratory buildings at Fannie Bay.

Prior to arrival steps were taken for their reception, and it was decided to place two calves in a screened pen (A) and two in an open pen (B), adjoining the other, but not in communication. The remaining calf was placed with the dairy herd (fifteen in number, eleven of which exhibited well-developed nodules in the pectoral region). These were grazing in the adjoining paddocks, but were milked in an open shed about thirty yards from the open pen (B). The screened pen was constructed as near as possible to exclude biting and other insects, and care was taken during the whole of the experiment to prevent introduction of insects by the attendant during feeding, watering, and cleansing operations. In order to obviate the possibility of insect infestation, a porch-way, with screened double doors, was constructed. The proximity of the infected dairy cattle, and the presence of buffalo in the immediate vicinity (about half a mile distant), the existence of so many insect pests (quite a number of which might be classified as possible carriers of blood parasites), rendered the site chosen for the experiments eminently suitable.

Careful examination, including microscopical examination of the blood of the imported calves, failed to reveal any trace of worm nodules or of embryos.

As regards the relative prevalence of the different species of biting flies in the vicinity of the laboratory, it may be said that *Lyperosia exigua* (buffalo-fly) greatly outnumbered all other species, and caused far more annoyance to stock than the larger flies. The parts usually attacked are the flanks, brisket, withers, ventral surface of the neck, and inner canthi of the eyes. *Stomoxys calcitrans* (stable-fly) were very numerous indeed, specially in proximity to the pens. These flies attack all parts of the beast, but a decided preference is shown for the flanks, brisket, and legs. The various species of *Tabanus* and *Silvius*

were relatively scarce, and were always noticed to attack horses in preference to horned stock, whereas *Stomoxys* and *Lyperosia* showed a marked preference for the latter. *Culicelsa vigilax* (black bush mosquito) were extremely numerous by day and night.

The details of experiments are as follows:—

(1) EXPERIMENT TO TEST WHETHER IMPORTED CATTLE FREE FROM *ONCHOCERCA GIBSONI* COULD BECOME INFECTED BY GRAZING WITH INFECTED CATTLE.

Imported calf (*a*), six months old, branded T near shoulder, was placed, on January 7, 1914, with the dairy cattle grazing in the paddock in the vicinity of the laboratory buildings. As a control, a locally bred calf (*b*), four weeks old, was also allowed to run with the cows. The conditions were favourable for natural infection.

Calf (*a*) was slaughtered on July 7, and the *post-mortem* examination gave positive results. Three small nodules, varying in size from a split pea to an ordinary pea, were present—one at the left second sternal segment, one at the junction of the left fourth rib and the sternum, and the third at the junction of the right fourth rib and the sternum. There was no evidence of infestation in other parts of the carcase, including the lymphatic glands.

The control calf (*b*) was slaughtered on July 15, and five small nodules were found—one at the first left sternal span, two at the junction of the sternum and the right fourth rib, and two at the right seventh rib. No nodules were discovered in other parts of the carcase. The nodules were forwarded to Dr. Sweet, in Melbourne, for examination, and her report confirmed the presence of *Onchocerca gibsoni* in the nodules.

Comment.—This experiment clearly demonstrates the presence of worm nodules in a calf reared near the laboratory, and the infection of the imported calf whilst grazing with worm-noduled cattle during the period January to July.

(2) EXPERIMENT TO ASCERTAIN RÔLE PLAYED BY INSECTS IN CARRYING *ONCHOCERCA GIBSONI*.

On January 7, 1914, two imported calves (*c*) and (*d*), six months old, and branded 7 near shoulder, were placed in open pen (B), the floor of which was concreted. The pen was quite exposed, and was only about thirty yards from the bail and cow-yards, where the dairy cows were milked twice daily. In fact, on two or three occasions these cattle were actually within a few yards of the pen, but never in contact with the experimental calves (*c*) and (*d*). No efforts were taken to prevent flies and lice from gaining access to this pen, and, as a matter of fact, from observations made, we know that the following insects attacked the calves during the period of detention:—

Tabanus nigritharsis.—Noticed on several occasions.

Stomoxys calcitrans.—Very frequently.

Hyperosia exigua.—Very frequently.

Hematopinus tuberculatus.—The tails and vulvæ of these calves were examined frequently for lice. On a few adult lice were found at the tip of the tails, and on the dates of slaughter their numbers had slightly increased. A few eggs were found in the usual position, viz., near the roots of the hairs at the tip of the tail.

Ticks were not found on any of the calves concerned in these experiments. The two calves in this open pen, in addition to the controls grazing with other stock in the adjacent paddocks, were accessible at all times to all the arthropods referred to in the first list.

Calf (c) was slaughtered on August 7, and the *post-mortem* results were negative for worm nodules. Calf (d) was slaughtered on September 7, with similar negative *post-mortem* results.

Comment.—The negative results of this experiment are of very great importance in considering the life-history of *Onchocerca gibsoni*, inasmuch that calves (c) and (d) had excellent opportunities for infection from biting flies, some of which must surely have previously attacked the infected cows in the neighbourhood. The theory that a biting fly acts as the intermediary host of *O. gibsoni* appears on this experiment not to be well founded, and further evidence must be forthcoming before such a theory can be established. The presence of lice (*Hematopinus tuberculatus*) on the tails of these calves seems also to preclude this particular species of louse as an intermediary host of *Onchocerca gibsoni*.

(3) CONTROL EXPERIMENT FOR (2).

On January 7 two imported calves (e) and (f), six months old, and branded J near shoulder, were placed in a screened pen (A). The calves were never in contact with the infected dairy cows or the other experimental calves. Although the utmost care was exercised to prevent biting flies from entering this pen, the following were found there: *Culicela vigilax*. During the first few weeks of these experiments both calves were freely bitten by *C. vigilax*, which were able to pass through the meshes of the wire gauze. Twenty-five specimens, taken in the pen about 8 a.m. on different occasions between January 8, 1914, and January 31, 1914, were microscopically examined, but no organisms were detected. Others taken under similar circumstances were examined after being kept in captivity for from two to five days, with the same results. *Culicoides subnitidus* (?), "sand-flies," were occasionally found in the adjacent paddock, and could have gained access to the calves, but none were found within the pen. A few *Musca domestica* and *Pycnosoma dux* entered the pen with the attendant, but steps were taken to prevent them remaining there more than a few days. No other insects or ticks were found in the pen, either upon the floor or upon the calves, during the experiments.

Calf (e) was slaughtered on August 8, and no worm nodules were discovered. Calf (f), slaughtered on September 12, also gave negative results.

Comment.—The negative results in this experiment are particularly interesting in view of the results obtained in Experiment (2).

EXPERIMENTS WITH CAPTIVE TABANIDÆ.

A number of Tabanidæ of four species (*Tabanus nigritarsis*, *T. gregarius*, *T. cinerescens*, *S. elongatus*—the last brought from Batchelor), were starved for varying periods, and then given an opportunity to bite a cow which had a very well developed nodule on the right pectoral region. The skin over the nodule was first shaved, the flies were then placed in a small wire gauze cage, or in a small beaker, and allowed access to the nodule. One species only (*T. gregarius* ?) could be induced to bite, and this but seldom. The flies avoided the nodule as far as possible, preferring the unshaven parts around it. Later on, when the hair had overgrown the nodule, the same preference was shown to the parts away from its summit. Only one fly could have been said to have fed freely upon the nodule. After this feed it was kept for eight days without food, excepting for one small feed of honey and water, when it was carefully examined. The results were negative, as they were in the case of several other flies which had fed round the nodule. These experiments were continued until the end of March, when it became impossible to capture more material.

HÆMATOPINUS TUBERCULATUS, BURM. (BUFFALO LOUSE).

It has been found that clean stock become infected soon after their arrival in Darwin. In all cases investigated by us, the tips of the tails were infected by adults, which oviposited first on the hairs growing from the extreme tip, and afterwards along the tail for a length of 8 in. to 12 in. The eggs were deposited on the hairs from $\frac{1}{2}$ in. to 6 in. from the roots (as many as eighty eggs being placed on a single hair), and hatched in from four to six days. Shortly after hatching the young larvæ commenced to travel up the tail, generally on the dorsal surface until within a few inches of the base, when they worked round to the ventral surface and attached themselves firmly to the fine hairs round the anus and vulva and on the escutcheon, where they remained until the nymphæ were about half-grown. We have never found adults on these latter parts, nor have we found half-grown nymphæ on the tail—facts which seem to indicate that after reaching a certain stage of development the nymphæ drop from the anus, vulva, and escutcheon to continue their growth on the ground. This point in their life-history is now being further studied by one of us. To our knowledge, *Hæmatopinus tuberculatus* has never been found on the bodies of cattle—either

domestic or running wild—nor has it been found upon the bodies of wild Brahma cattle, although the tails of the latter are infected. On the other hand, one of us has had opportunities for examining a number of Swamp buffaloes, and has found these lice on the tails, flanks, necks, and bellies of the majority. In these animals the tail, vulva, anus, and escutcheon are less subject to infection than the body. The nature or absence of the hair probably determines the choice of position selected by the lice.

CONCLUSIONS.

The results of the experiments may be summarized as follows:—

(1) Local cattle may become infected with worm nodules a few months after birth, as well-developed nodules were found in calf (b). Cattle from Victoria where worm nodules are rarely, if ever, present, grazing in the ordinary manner with infected cattle may become infected with *Onchocerca gibsoni* within six months, as typical nodules were discovered in calf (a).

No evidence can be adduced regarding the mode of infection.

(2) The housing arrangements of calves (c) and (d) were such that biting and flying insects had ready access to the animals, and as the distance from the infected cows was not great, we can certainly assume that these biting and flying insects had good opportunities for infecting the calves. The fact that they were not affected during the seven to eight months' period of exposure to possible insect vectors apparently indicates that the intermediary host is not a biting or flying insect, and even an ordinary skin parasite, e.g., *Hæmatopinus tuberculatus*, which travels a short distance, may be eliminated.

(3) The negative result of this experiment, as also (2), points to the probability of the intermediary host of *Onchocerca gibsoni* being on the ground. Both pens were floored with concrete; the experimental calves had no chance of lying on or near the ground where infected cows had previously laid. It seems to us to indicate that part of the life-history of the parasite is spent on the ground.

Since these experiments were finalized, we have received Dr. Cleland's report on his further investigation into the etiology of worm nests in cattle. We note his remarks on the possibility of *Stomoxys calcitrans* or *Culicela vigilax* acting as intermediary hosts of *Onchocerca gibsoni*. In the light of our knowledge here, and in view of the results of the experiments conducted at the laboratory, we cannot add support to his contentions.

SUGGESTED FUTURE EXPERIMENTS.

(1) A further series of experiments on similar lines to No. 1 already conducted, to be commenced at a later period of the year, say, from June to December. Such experiments would determine whether cattle become infected at a period when biting flies are not numerous.

(2) Experiments Nos. 2 and 3 should be again followed, but on different lines; one calf to be housed in an open pen with the ordinary ground floor, and infected cattle allowed to come right alongside. Another calf to be housed in a pen raised on piles from the ground, discs being placed in piles, and tanglefoot or an insect repellent smeared on piles below discs. The infection of the calf in the ground pen would demonstrate the possibility of infection from a winged or crawling insect; and the infection of the other calf would exclude the latter.

(3) A special study of the biting flies of the Territory should be made, particular attention being devoted to those which attack buffalo, and also ground insects which may be possible vectors.

(4) Regular microscopical examination of biting insects and further experiments with captive biting flies.

POISONOUS PLANTS.

ORDER SOLANACEÆ.

By J. B. CLELAND.

Datura Stramonium, Linn. "Mad apple," or "thorn apple."— . . . "This plant is decidedly poisonous, although it is questionable whether it is often eaten by stock, except by quiet milkers and working bullocks, which sometimes nibble at it. In 1874 the stomach of a cow, the property of the police magistrate at Toowoomba, that had died from some cause, was forwarded to Mr. K. T. Staiger, then Government analyst, for analysis, and he found a quantity of this plant in the stomach. The cow had been browsing on land about the outskirts of Toowoomba, where this plant was at the time growing in great abundance."— Bailey and Gordon.

Turner refers to this plant as a supposed Western Australian poison plant.

Datura Leichhardtii. F.v.M. Native "thorn apple."— . . . "This plant is met with in the northern parts of South Australia, North Queensland, and North Australia. From several localities it has been sent to Brisbane as a suspected poison herb."— Bailey and Gordon.

Nicotiana suaveolens, Lehm. Native tobacco.— . . .

"Met with in one or other form in all the Australian colonies. There is a general consensus of opinion amongst stock-owners that this plant is poisonous to stock. It is credited with causing the deaths of many travelling sheep. Mr. Hutchison instances a case which came under his notice of 300 rams being poisoned by it. The effects upon sheep are drooping head, dull eyes, swollen tongue, and, a few hours before death, paralysis of the loins. Dr. T. L. Bancroft, in a note communicated to the Royal Society of Queensland in January, 1886, has shown that this plant is undoubtedly poisonous, and that this is due to the presence in it of an alkaloid having all the physiological properties of the nicotine of the true tobacco plant."—Bailey and Gordon.

Turner gives it for Western Australia.

Maiden states that this is an indigenous tobacco containing only a small quantity of nicotine, and that sheep, cattle, and horses browse on it more or less with their feed, and as a very general rule it does them no harm. At the same time authenticated cases of poisoning from eating this plant do not appear to be available, but inasmuch as deaths do occur to travelling stock—*i.e.*, those which, tired and hungry, gorge themselves with the plant—he suspended judgment that the cause of death may be nicotine poisoning.

Nicotiana glauca, Grah. "Tree tobacco," "wild tobacco."—Maiden (*Agricultural Gazette of New South Wales*, 1897, p. 15) states that this South American plant is very occasionally sent to Sydney from the interior of the colony as a poison plant, but he thinks without sufficient proof. He quotes Professor M'owan, of the Cape of Good Hope, as saying, "There are conflicting accounts respecting the poisonous qualities of this plant in this country. Occasionally we hear of young ostriches being poisoned through eating its leaves, but shall be glad to get any authentic reports on the subject, as it appears to be very likely to be injurious to all kinds of stock." Mr. Bailey says: "It cannot be very poisonous, because fowls eat it greedily in autumn when green stuff is scarce, and horses browse upon it, and neither fowls nor horses appear to be injuriously affected by it."

[The tobacco plant is now grown in England].—*Report of the Government Bureau of Microbiology, New South Wales.*

NOTE ON A FEEDING EXPERIMENT WITH *CYSTICERCUS TENUICOLLIS* AND *ECHINOCOCCUS VETERINORUM*.

By J. B. CLELAND, M.D., CH.M.

DURING the feeding of a dog with specimens of these two species of *Cysticercus* from a sheep, for the purpose of obtaining the adult tape-worms in the intestines of the dog, the following interesting points were noticed, which illustrate the way in which the perpetuation of each of the species is achieved, in spite of the danger of injury during eating.

In the case of the *Echinococcus*, numerous scolices are of course present in fertile cysts, representing the immature heads of future tape-worms. Though such a cyst, embedded in the substance of the liver, must be severely crushed during the process of mastication, and many of the scolices must be thereby injured, a number of these must still escape destruction and be able to mature later on in the intestine.

In the case of the *Cysticercus tenuicollis*, however, in each individual cyst there is only one head of the future tape-worm (*Tænia marginata*).

It happened that during the feeding of the dog these two types of cyst, embedded in or attached to portions of the liver of a sheep, were presented to the animal. Those portions containing *Echinococci* were crunched up by the jaws of the animal and eventually swallowed. When, however, the piece of liver, to which by its long pedicle was attached the *Cysticercus tenuicollis*, was taken into the mouth of the dog, the liver was seized and masticated, while the cyst remained hanging out of the side of the mouth by its long attachment. When the animal had sufficiently masticated the liver, this was swallowed, and in the process the intact cyst was carried down into the stomach. In this way the single head present in the *Cysticercus tenuicollis* escaped all injury from the jaws. It would seem, therefore, that the lax condition of this cyst tends to lessen its risk of rupture by pressure with subsequent injury to the head, whilst its pedunculated character still further protects it when portions of liver or other viscera to which it is attached are seized and eaten by dogs.

This difference between the two cysts has doubtless received attention previously. Nevertheless it seems worth while again recording.—*Report Government Bureau Microbiology, New South Wales.*

Reviews.

Veterinary Therapeutics: a Guide to the Treatment of Disease in the Domestic Animals. By E. Wallis Hoare, F.R.C.V.S., Lecturer in Veterinary Hygiene, University College, Cork, Editor of "A System of Veterinary Medicine"; Editor of Clinical Department, *The Veterinary News*; Honorary Member of the American Veterinary Medical Association, &c. Third Edition. Demy octavo. Pp. xxiv + 943. Published by Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden. 1916. Price 18s. net.

This, the third edition of "Veterinary Therapeutics," has been entirely rewritten by the author. It has been modernized, and due regard is given to the fact that drugs are intended to aid the forces of failing or weakened Nature and not to command them. A knowledge of physiology is really the basis of therapeutics. The information with reference to the preparation of drugs is not elaborate, but sufficient for the needs of the practitioner and student.

Inasmuch as one cannot treat disease without making a diagnosis of it, first place is given to the recognition and general symptoms of illness, and the bedrock of successful treatment is discussed and elucidated in a very valuable section on the Care, Management, and Nursing of Sick Animals. The practice of examining the urine of ailing subjects is not adopted generally in veterinary practice, and yet it is quite important in many cases. The tests given by the author are not hard to carry out, and will furnish the clinician with much valuable knowledge, and seldom have we read (never in veterinary text-books) such a complete list. Horses, cattle, sheep, pigs, dogs, cats, and birds are dealt with in their class with respect to care, management, and nursing, and if we get those under us who have a good knowledge of the matter derived from these pages, then our tasks will be lightened, and we shall be approaching the human standard of nursing, whilst if we are competent to give the instructions ourselves and see them carried out our patients will be under the best conditions for recovery. We all know, however, the difficulties, in many cases insuperable, that we have to contend with in this respect, and there is something in the suggestion that easily accessible animal hospitals are the best instruments to ensure and propagate a knowledge of ideal curative tending and care.

The *Materia Medica* section, comprised in Part II, is condensed yet complete. We do not note the omission of any really valuable agent either ancient or modern. There is a very useful chapter on animal extracts, vaccines, sera, &c: Marvellous to relate, the text in this section is at times very interesting reading. The man is an artist that can make the description of the preparation and uses of drugs delectable, and if more attention was given to this matter we might possibly have more real live

chemists in our land. For some time we have desired to gain a more complete knowledge of hypodermic medication in animals. We think there is room for a little book to be devoted entirely to the subject. The work under review does not advance our knowledge of this subject.

The third section on Special Therapeutics will be very acceptable to the practitioner. It is not too lengthy, and can at all times be consulted with advantage.

In regard to red-water, the author does not seem to believe that all the cases here are due to ticks, and we are inclined to agree with him. The writer advocates early tapping in cases of pleuritic effusion. When fluid comes through the canula the practitioner gains credit, and the procedure does good. When nothing emerges the owner is not greatly struck by the operation, and may even think that the practitioner has made a mistake in his diagnosis. The lines on passing the stomach tube are very instructive, and those of us who desire to get out of routine and rut in the treatment of gastric impaction and tympany may read them with profit. In the Appendix many useful formulæ are given, which we hope will be adopted more by the practitioner than the general public. In the preface to his work the author states that the list of drugs (their actions and uses) is limited to those whose practical utility has been demonstrated clinically. We can only conclude that experience has proved the efficacy of the absorbent (?) liniment for capped hocks given at the top of p. 894, otherwise we should think that a mistake had occurred.

The book is well printed and bound, marks an advance in an inexact science, and is quite up to date in its matter and compilation. It should have a wide circulation and enhance the reputation of its author and our profession. Messrs. H. Begg, G. Mayall, W. M. Scott, and H. Gray have given Mr. Hoare assistance and co-operation in the production of the work.

G. M.

The Cornell Veterinarian. April, 1916. Edited by C. P. Fitch.
Published by D. H. Udall, Ithaca, N.Y. Price \$1 per year.

This is a specially good number of the periodical. The Editor comments on a Bill before Congress which deals with the automatic promotion of veterinary and lay inspectors in the U.S. Bureau of Animal Industry. The remuneration of the veterinary inspectors starts at 1,400 dollars per annum, and rises to 2,400 dollars, and afterwards at the discretion of the Secretary of Agriculture. The lay inspectors are to receive maximums of 1,600 or 1,800 dollars according to their grade. The Editor considers that the lay salaries are somewhat high as compared with the veterinary ones. A. Eichorn, Chief of the Pathological Division Bureau Animal Industry, contributes a well-thought-out paper on Biological Therapeutics. There are clinical records by W. Reid Blair on Tuberculosis in the Dog and Cat, and interesting notes by H. J. Milks on Verminous Bronchitis in Dogs, whilst W. L. Williams discourses on the Diagnosis of

Pregnancy in Cattle. There are two case records of gastro-intestinal catarrh in cattle which were treated at the Ambulatory Clinic, N.Y. State Veterinary College. The reviews include those of the "American Illustrated Medical Dictionary," by W. A. N. Dorland, and "Essentials of Veterinary Law," by H. B. Hemenway.

ARMY VETERINARY SERVICE.

TEMPORARY Lieutenants to be temporary Captains: T. F. O'Brien, S. H. Skeston, W. Burt, T. H. Sherlock, F. Birkin, L. W. Heelis, J. E. Hutchinson.

Lieutenant-Colonel G. Elphick relinquishes commission, with permission to retain rank and wear prescribed uniform.

The surname of Lieutenant F. Murphy is as now described, and not as in *Gazette* of May 2.

Temporary Lieutenant A. Cowan relinquishes commission on termination of agreement. Temporary Lieutenant H. A. King relinquishes his commission on account of ill-health.

R. G. Wilson, J. A. Brew, and Kenneth D'Arcy Sewell to be temporary Lieutenants.

J. Scott, late temporary Lieutenant, to be temporary Captain. W. P. B. Beal to be temporary Captain (substituted for notification in *Gazette* of August 30, 1915).

Captain H. G. Westgate relinquishes commission on account of ill-health.

To be temporary Lieutenants: F. C. Golden, J. R. Barker.

Captain (temporary Major) J. E. L. Still relinquishes temporary rank on alteration in posting. Captain J. L. C. Jones to be A.D.V.S., and is granted temporary rank of Major while holding the appointment.

B. A. McGuire to be temporary Lieutenant.

F. E. Jones to be Lieutenant.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.

THE
VETERINARY JOURNAL

JULY, 1916.

Editorial.

ON DOING OUR BIT.

THOUGHTS on the welfare of his country loom largely in the mind of every Britisher at present. Each in his own way is inclined to do what he can to help her in this time of stress and strain. The younger members of our body have responded largely to the military call, and are doing good work in their respective spheres—they are aiding directly in shortening the long, long trail. Their youthful energy and keenness will find joy and satisfaction in carrying out exacting work in an atmosphere of danger and adventure. They are up against the real thing, and count as valuable units of the first line in the defence and salvation of our country. All honour to them; may their work and effort bear full fruition, and may we at home remember the sacrifices that have been made by those who "for our sakes without question put from them all that they cherished." The young, the vigorous, and the strong have not lived for themselves alone. They have cast their eyes beyond self-interest, the parish, and the pump, and, as is the way of youth, have taken a bee-line for the sake of "England, home, and beauty."

And what of those of us who are left here? Are we to be found lacking or wanting? Important work remains to be done by those who have got into stiff moulds, who are somewhat unadaptable and inelastic, who have lost the enthusiasm and go of early years, who consider themselves physically or mentally unfit for the very strenuous life. Some of us, beyond the meridian, are inclined to be a little depressed as to our fitness for service of any kind, and to be doubtful as to the way in which

we may be able to further the great cause. We can satisfy ourselves that we need not be among the non-starters if we take a wide and discerning look around and bear in mind that "he is a slave of the greatest slave who serves nothing but himself."

The need is for men, food, money, and munitions. The present price of the vital necessities of life is a continual reminder of the importance of increasing the country's food production and supply. Many a veterinary surgeon has a kitchen garden that can produce desirable vegetables and fruit. Let it be carrying top weight, let no ground be left unproductive or unfruitful. Not a few men have a direct interest in animal production. He who does his best in increasing the output, whether his skill and attention be devoted to the breeding of horses, cattle, sheep, pigs, fowls or goats, is aiding his native land.

Then there is the money question! What an eternal, never-failing, ever-pressing struggle ranges round it. The everlasting bills and bills and the everlasting money! There is only a certain quantity of it in the world, which accounts for the flowery way of the financier. Some men acquire more wealth than others, but most of us manage to get a bit of it. In days gone by there were two chief troubles associated with it. One was getting it, and the other knowing what to do with it when we had got it. At the present time the latter proposition is no puzzle at all, for are there not War Loan and Exchequer Bond securities waiting to be culled and cuddled—securities of the gilt-edged stamp returning desirable rates of interest?

Again, collectively, we can all subscribe to the Royal College of Veterinary Surgeons, and by doing it whole-heartedly we can give our Council a surplus to invest for the welfare and salvation of our country. This is the least any man can do, and nobody ought to leave room to have a row with his conscience for not doing it. It is a bare minimum of sacrifice that can be asked and given. Then there is the Army Veterinary Corps Comfort Fund. It has gone well up to the present. It ought not to be forgotten. It helps to keep a deserving body of men fit, for it provides means to preserve and maintain health, to keep heart in those who have to do their duty under trying circumstances, who value help and sympathy, and are always ready to express their gratitude. Provision for keeping active units in good form who are directly operating for their country's sake is fine service. Individually and collectively, then, we can see ways and means to do our bit for the defence and safety of our land.

What of munitions? Most of us will perhaps exclaim, What can we do in this connection? Well, parsons, and what the

lords of creation have been pleased to term "the weaker sex," are helping to make shells, and are we to be beaten and outstripped by them? A veterinary surgeon on a big gun would doubtless be like a fish out of water, but there are those who have the mechanic's eye and touch that ought to be useful in this domain.

By some the shoeing forge is considered derogatory to the practice of veterinary science and art, but many of us have them, and the Army authorities can take horse shoes. We can help to satisfy their need.

In future years let it not be said that the veterinary profession did not do its full share in the great struggle. We are a small body, but let us be large in our supply of pluck, energy, foresight, resource and patriotism. Let us all appreciate and answer to the full the call in the lines which read:—

"Breathes there the man, with soul so dead,
Who never to himself hath said,
This is my own, my native land!"

G. M.

INTERESTING CONTRIBUTIONS

We are publishing this month the second Australian Supplement, which ought to be of great interest to readers in the Homeland. There is hardly any disease from a veterinary point of view that calls for more attention as regards research and observation than that dealing with the structure of bone in health and disease. The paper by Mr. W. T. Kendall, D.V.Sc., M.R.C.V.S., throws a new light on the subject, is well thought out, and results from a crowd of experience that we are unable to get in this country. The note by Mr. J. C. Lewis, D.V.Sc., B.Sc., on "Thrombosis of the Spermatic Veins," is a valuable contribution. Many of us in examining entire stock and in the examination of horses as to soundness encounter swellings in the scrotal region which in many cases are difficult to describe accurately. The more really scientific observation on the matter the better. We welcome the work of our Australian *confrères*, and congratulate Major H. A. Woodruff and Major F. Hobday on the real service they have been able to institute and inaugurate on behalf of veterinary science.

There is also in this number a valuable little note by Mr. H. L. Roberts, F.R.C.V.S., on coital exanthema. The disease has been observed frequently on the Continent, but there is little, if any, reference to it here. We shall welcome any future contribution on the matter from country practitioners. The complaint is very important from the stockowners' and breeders' point of view, and a full description of the clinical symptoms in the male and female will benefit us.

G. M.

Original Communication.

PARALYSIS OF THE AUDITORY NERVE OF THE FOWL.

By B. F. KAUPP, M.S., D.V.M.

Pathologist, N.C. Experiment Station.

Anatomy of the Parts.

It may be well to give first the origin and distribution of the auditory nerve before taking up the disease of the same.

In the fowl the facial (seventh pair of cranial nerves) and the auditory, or eighth pair, are so intimately associated, that we will describe the origin and distribution of both at the same time.

The facial nerve originates, with the auditory, from the cerebellum. It divides into three parts, the first probably the complex ganglion, with the posterior root of the auditory. This root belongs to the somatic sensory group of nerves. From this same group originates the auditory, which spreads out into the cochlea and takes the impression of sound. This nerve is short and thick, and at the point where it loses its medullary covering on entering the cochlea there is developed a ganglion. This ganglion is similar to the spinal ganglion.

The second part originates by one root which is located medially and ventrally from the deeper ganglion cells. Some of the fibres from this root constitute the vestibular branches and accompany the auditory, and supply the anterior part of the ear labyrinth and semicircular canals. The larger part of the fibres of this trunk make up the intermediate part of the facial. The geniculate ganglion is formed at their fusion. The sympathetic sphenopalatine nerve emerges from this ganglion, coming out of the aqueduct of Fallopius.

The third part is called the portia dura, and is the main facialis. It is located opposite the auditorius intermedius. Its roots may be traced to the complex ganglion, from which they take a ventral direction.

Paralysis of the Cochlear Nerve.

The paralysis of the cochlear nerve, the true organ of hearing, may be a congenital defect, and has been observed in ambiotic animals. It is due to a defective condition of the spinal ganglion

with resulting degeneration of the organs of Corti. Paralysis of the nerve may also be caused by inflammatory changes in the internal ear, or intracranial disease in the neighbourhood of the medulla oblongata. It has been observed as a symptom in coccidiosis, and also in fowl plague.

Paralysis of the Vestibular Nerve.

This condition is frequently observed in birds. It is often caused by inflammation of the middle or internal ear. It has been observed in fowl pest. This condition is also brought about in caries of the petros temporal bone. Concussion of the brain and haemorrhage of the internal ear is also a causative factor. Certain disease conditions of the cerebellum and medulla oblongata may cause an interruption in the conductivity of the vestibular nerve. In pigeons it is observed in contagious meningitis.

The symptoms of bilateral disease of the cochlear nerve is easily recognized owing to the fact that there is complete deafness. If it is unilateral, the symptoms may be so meagre that its presence entirely escapes the observation of the owner.

Unilateral paralysis of the vestibular nerve is evidenced in all species by the head being held in an oblique manner, the diseased side being held lower. The head may be held in a position under the front part of the body, with the lower part of the head turned back towards the sound side. This turning of the head may be slight or 45° to 75° , but in birds it may be as much as 180° , or even more. If the head be carried under the body the roof of the cranium may touch the ground. The abnormal position of the head causes the animal, if they try to move at all, to walk in a circle towards the sound side, but sometimes in the opposite direction, or, at any rate, they cannot walk in a straight line. There is frequently a horizontal rolling of the eyeballs towards the sound side with conjugate position of the eyeballs. There may be difficulty in taking food, and in birds it is commonly quite impossible. If the disease is bilateral it closely resembles cerebellar ataxia, only the symptoms are limited to the head and neck.

If the paralysis is due to an injury the disease, as a rule, is not permanent, and the symptoms all disappear in a few days or weeks. If the condition is due to pathological changes in the

auditory nerve or nerves the symptoms are persistent, depending on the nature of the primary cause. The bird may after a while die.

In traumatic causes the bird should be kept in a quiet place free from annoyances, and, if necessary, artificial feeding. If there has been an injury and haemorrhage taken place in the tissues, surgical interference may be indicated. In cases in pigeons due to contagious meningitis, an attempt should be made to isolate the diseased bird and carry out thorough disinfections. Calomel should be given to the bird, and cold-water packs applied to the head.

Cases of Vestibular Paralysis.

Fig. 1 shows a picture of a single comb Rhode Island red hen which was sent to the laboratory from the Iredell Test Farm. This hen had the run of the farm with the balance of the flock. She was about 2 years old.

There was nothing in the history of the case to indicate

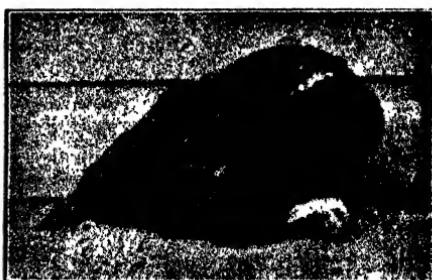


FIG. 1.—Paralysis of the auditory nerve of a fowl.

whether the hen had met with an accident or had a diseased condition of the auditory nerve. The bird, as is shown in the cut, held her head backwards, and turned at an angle of about 45°. A thorough examination of the external auditory canals did not reveal any signs of violence or parasitism. Eating was accomplished with difficulty, and the bird, after suffering in this manner for a period of sixty days, died.

A second case in which the bird showed similar symptoms, and in which examination of the auditory canals and skull were negative, after a period of five weeks gradually showed signs of improvement, and finally recovered.

A very interesting case came to the notice of the laboratory. A lot of baby chicks, consisting of Buff Plymouth Rocks, were taken from the mammoth incubator, March 5, 1916. On March 15 one of the birds, which had been brooded in an international hover, showed symptoms of paralysis of the auditory nerves. This chick could eat and drink with some considerable effort, but would again turn its head downwards under the fore part of the body until the top of the cranium touched the floor. The head was held only slightly to one side. It was thought that

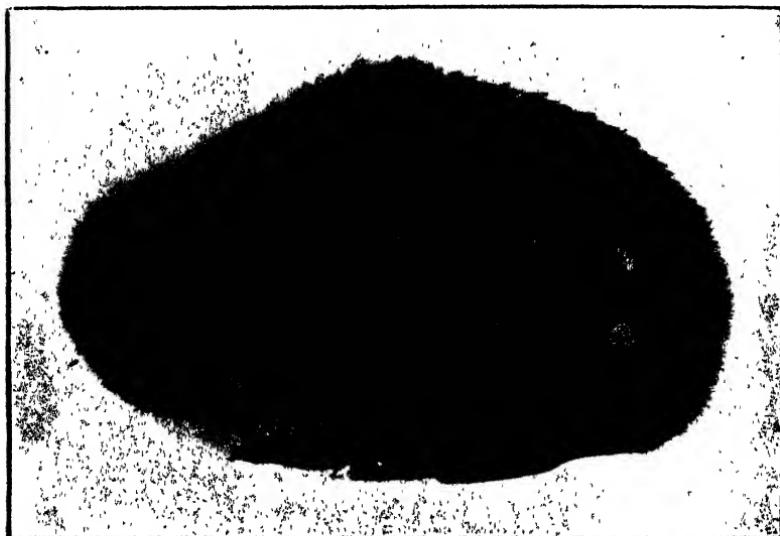


FIG. 2.—Paralysis of the auditory nerve of a baby chick.

possibly this chick had sustained an injury to its head. It was leg-banded and returned to the hover. In a few days some improvement was noted, and complete recovery taken place in three weeks from the time the first symptoms was noted. It is believed this condition was due to an injury. (See fig. 2.)

A fourth case was studied in a flock of 500 baby chicks, all being pure bred Single-comb White Leghorns. The chicks were hatched in an international incubator and brooded in an international hover. On the third day one chick was noted to turn its head at an angle of about 45° and turn in a circle to the left. This antic was frequently indulged in; the bird could not eat except when aided. Its appetite was good, and it frequently

acted as though hungry. This chick was kept for experimental purposes, being aided in securing food, but the condition apparently interfered with nutrition, and the chick showed no growth, rapidly falling behind the balance of the flock, and finally died when about three weeks old.

Pox of TURKEYS.

We have been studying a condition among turkeys in this laboratory for the past few months. This condition appears different from any disease we have heretofore studied, and we find that it is, in some years, quite prevalent in the south-eastern States and in Cuba.

The turkeys brought to the laboratory were kept in a back yard of a city residence. There were four in the flock, and one after the other had become affected.

From the standpoint of a field study it appears to be contagious.

The poxes are noted on the unfeathered portions of the head and neck. There is at first noted a small pimple-like elevation, which gradually becomes larger, and in the course of a few days may appear 4, or even 5 cm. in diameter, and 2 or 3 cm. high (see fig. 3, No. 1). They do not appear as does chicken-pox, as observed upon the fowl—that is, there is no rounded bleb-like appearance, but, on the other hand, appear with almost perpendicular walls with a flat top, and may be likened to the shape of an opera hat (see fig. 3, No. 2).

In the course of a few days, in many cases without any treatment, the diseased area becomes dry and may be picked off, leaving a whitish scar-like spot (see fig. 3, No. 3). The disease usually does not appear very virulent, and little or no treatment is required. In some cases where we have advised the use of a 5 per cent. carbolized vaseline excellent results have been reported. Then, again, where we have had some cases under our own observation they recovered without any treatment. However, there can be little doubt but that at times the attacks are rather severe, and may even cause death. While this has been reported to us upon good reliable sources, yet we have not personally made such observations. The cases studied in the laboratory did not appear to suffer constitutionally, as there was no loss of appetite, and the birds were in good flesh.

Only one test was made to determine if the disease could be transmitted. The curetting from a flesh nodule was rubbed in a scarified area of the comb of a three-year-old White Orpington cock. The results of this one test were negative. No opportunity was afforded to conduct experiments upon turkeys not exposed to the disease, though such procedure is contemplated.



FIG. 3.—A peculiar acute nodular disease of the heads of turkeys, in some respects simulating chicken-pox.

HORNY GROWTHS ON THE CUTICULAR SURFACE OF FOWLS.

Horny growths are reported as occurring on the cuticular surfaces of fowls by Gadow. Horny growths have been observed on the cuticular surfaces, and on different parts of the body of cattle and other animals.

The present case is of importance on account of its immense size as compared to the size of bird upon which it was found.

Dr. Leonard, of Asheville, sent to this laboratory a specimen represented in fig. 4 with the case history that it was excised from the thigh region of a two-year-old hen. No further history could be obtained. The specimen measured 14 cm. long and



FIG. 4.—A horny growth from the thigh of a fowl.

7·5 cm. in diameter at the base. The outer structure is horny-like, resembling the horny structure of the spur or claw. There will be noted here and there a feather which has developed. The inner core consists of connective tissue and some adipose tissue, and is soft in texture.

General Article.

THE PRESENT AND FUTURE MEAT SUPPLY AND THE QUESTION OF THE FREE IMPORTATION OF CANADIAN CATTLE.

BY THOMAS PARKER, F.R.C.V.S.

Veterinary Inspector under the Diseases of Animals Acts, and Inspector of Meat, Provisions, &c., for the City and County of Newcastle-upon-Tyne.

DURING recent years the problem of how to maintain within this country a supply of meat, sufficiently abundant to be within the reach of all classes, has been certainly—if gradually—becoming more and more difficult. Owing to the gradual increase in the price of meat before the War and the further increases since, farmers and stock-breeders have been more or less tempted to hurry into the markets animals which would under ordinary circumstances have been kept a longer period, either for breeding purposes or to be fed to maturity as the case may be.

For example, one of the causes of the shortage of cattle is attributed by the Board of Agriculture and Fisheries to the slaughter of calves, either immaturely or legitimately fattened. Similarly, the increased slaughter of not only lambs but also of breeding ewes has gone on rapidly, due to the increased prices of mutton. In fact, the total number of sheep recorded for England and Wales in the year 1913 was the smallest on record, being 5 per cent. less than in 1912. But no matter in what part of these islands such a short-sighted policy is allowed to go on unchecked, the whole of the United Kingdom will ultimately suffer. Remember, we are far from being self-supporting.

According to agricultural statistics for the year 1913, it is estimated that of the total meat supplies of the United Kingdom about two-fifths are imported from over the seas. Moreover, it is generally admitted that the world's meat supplies have been found during the past year or two to be rather less than hitherto.

Whilst the whole of Europe is not always at war, the United Kingdom is, nevertheless, always in the peculiar position of being separated from considerable sources of her food supplies by large stretches of sea.

The reasons why the subject is one that should seriously

engage public attention at the present time may perhaps be best considered under the following heads, namely:—

- I.—Reasons why meat was getting dearer before the War.
- II.—Reasons for very high prices during the War.
- III.—How to provide for the future.

I. REASONS WHY MEAT WAS GETTING DEARER BEFORE THE WAR.

For many years the population of the United Kingdom has been increasing at the rate of about 400,000, or two-fifths of a million annually. In the year 1893 it was 38,429,992, whereas twenty years later—that is to say, in the year 1913—the population of the United Kingdom had reached a total of 46,035,570. It was only natural, therefore, to expect that the total amount of food required annually had also increased enormously, although without any material alteration proportionately, to the individual. But we find that, during the same period, the total amount of meat obtainable annually from our home-bred herds has not increased in anything like the rate necessary to supply a proportion per head of the population in 1913 equal to that available twenty years earlier, e.g., in the year 1893 we had in the United Kingdom some 11,207,585 cattle, 31,774,686 sheep, and 3,278,082 swine, from which we expected about 28,000,000 cwt. of meat per annum; whilst in the year 1913 there were only 11,936,600 cattle, 27,629,206 sheep, and 3,305,771 pigs, which together were capable of producing an annual total of between 30,000,000 and 31,000,000 cwt. of meat. It will be noticed that whilst cattle and pigs show a slight increase, sheep show a considerable decrease in numbers.

Now owing to the rate of increase of the population being not only much faster, but out of all proportion to that of the increase of the total amount of food available from our herds, the quantity necessary to make up for the deficiency and meet the demands had to be obtained either by the importation of live cattle, dead meat, or both.

First let us consider the cattle imports. In the year 1894 there were imported into the United Kingdom 475,440 cattle, 484,597 sheep, and 8 swine, whereas in the year 1914 there were only 2,234 cattle and 1,707 sheep imported. It will therefore be observed that our food supplies as derived from imported live stock have—for all practical purposes—been reduced to *nil*. And

this latter reduction had nothing whatever to do with the War. On the other hand, the total imports of beef, mutton, pork, bacon, hams, &c., have increased from 9,304,664 cwt. in the year 1893 up to 22,752,652 cwt. in the year 1913. Notwithstanding this huge increase in the imports of dead meat during the past twenty years, it should be borne in mind that the greater part of that increase occurred during the first eight years, for during the past twelve years the imported meat supplies have remained very nearly stationary. Moreover, it is evident that competition for these foodstuffs is so developing through the requirements of other countries, that as a result the supplies available for export to this country are likely to either decrease or fail to meet our demands.

Finally, after deducting exports from this country, when we compare the sum total of meat obtained from home-bred and imported animals, and imported carcases, &c., available in the year 1893, with that of the meat obtained in precisely the same way in the year 1913, we find that whilst on the one hand the total annual supply of meat in the United Kingdom has increased, the total supply per head per annum has, on the other hand, owing to the proportionately greater increase of the population, decreased, hence the rise in price.

II. REASONS FOR VERY HIGH PRICES DURING THE WAR.

The following may be accepted as being amongst the chief reasons for the great rise in the price of meat available to the general public:—

(a) The purchase of large quantities of frozen, chilled, and other meat (including all the meat produced at Australian and New Zealand meat works, and available for export) by the British Government, not only for troops at home and abroad, but also for use of the Allied Forces. It might be asked, "What difference does it make regarding supply and demand, whether a man be a soldier or a civilian?" The answer may be illustrated thus: Supposing 2,000,000 men join the Army, they are then fed according to Army rations. In civilian life each individual in the United Kingdom—according to official statistics issued by the Board of Agriculture for the year 1913—will find his proportion of the estimated total meat supply to be 127·6 lb. per annum. But on entering the Army the same individual would

be supplied with 1 lb. of meat daily, which is just $10\frac{1}{2}$ oz. more than his total daily share in civil life. Summed up, this means that during the first fourteen months of the War 2,000,000 men in the Army would annually dispose of 4,206,080 cwt. of meat (an amount equal to one-twelfth, or 8·3 per cent. of the total amount of meat supplies of the United Kingdom), more than the total amount they would during civil life. Recently the Army rations have been reduced to $\frac{3}{4}$ lb. meat per day. Now supposing an army of 3,000,000 men are receiving $\frac{3}{4}$ lb. meat daily, that would mean that such a vast force would have issued out to them something like 3,700,000 cwt. per annum (an amount equal to nearly one-seventeenth, or about 6 per cent. of the total meat supply of the United Kingdom), more than the total amount they would during civil life.

(b) Fewer ships carrying meat over the seas, and increased freights.

(c) Owing to a considerable extent to the above circumstances, the increased cost of meat before being exported to this country, which fact is best illustrated by comparing the value of imports during the year 1914 with those of the year 1913:—

Meat imported into the United Kingdom.				
Year 1913	Beef	9,203,310 cwt.	..	Value £16,070,833
	Mutton	5,388,380 „	..	„ 10,907,992
	Pork	495,854 „	..	„ 1,368,360
Total			Value	£28,347,185
Year 1914	Beef	8,844,567 cwt.	..	Value £18,960,171
	Mutton	5,202,503 „	..	„ 11,411,423
	Pork	861,203 „	..	„ 2,360,722
Total			Value	£32,732,316

(d) As an illustration of still more demands, it may be mentioned that at a meeting of mayors of chief Italian towns held in Rome some months ago, it was announced that the Government would replace the requisitions of cattle for use of the troops by the importation of large quantities of frozen meat.

III. HOW TO PROVIDE FOR THE FUTURE.

The final question we have to deal with, and perhaps the most important one, is: How can we best provide for the future? An endeavour will be made to answer that question under the following headings, namely:—

- (1) The production within the herds of the United Kingdom.
- (2) The importation of fresh, frozen, and chilled meat.
- (3) The exportation and importation of live animals.

(1) THE PRODUCTION WITHIN THE HERDS OF THE UNITED KINGDOM.

The meat supply available from our herds during the past twenty years has already been referred to. Perhaps the position in regard to the production of our herds will be better understood if we look for a moment to the figures extending over the past thirty years.

In the year 1884 there were 10,423,284 cattle in the United Kingdom, whilst in 1913 there were 11,936,600. In the year 1884 there were 29,378,427 sheep, whereas in 1913 there were only 27,629,206; and whilst there were 3,906,560 swine in the year 1884, there were only 3,305,771 in the year 1913. On the other hand, the population of the United Kingdom has increased from 35,951,865 in the year 1884 to 46,431,548 in the year 1914.

It will be observed, then, that during the past thirty years, whilst the population of the United Kingdom has increased by very nearly one-third, the cattle have only increased by about one-eighth. Furthermore, when it is remembered that sheep—during the same period—have decreased by 1,749,221, or a little more than 6 per cent., and that swine have decreased in numbers by 600,789, or about 15½ per cent., it should be clearly evident that, so far as the production of meat for the nation is concerned, our home-bred stock have been gradually lagging behind.

With the view, no doubt, of combating the indiscreet slaughter of certain classes of animals, the Board of Agriculture and Fisheries have found it necessary to issue an Order known as the :—

Maintenance of Live Stock Order of 1915.

This Order came into operation on August 23 last, and provides, as from October 1, 1915, that no calf under six months old, or any animal visibly or obviously in-calf or in-pig, shall be slaughtered excepting such as are defined in the Order. It will be admitted that the Order is a step in the right direction. Unfortunately, however, there does not appear to be any possibility of the Order fulfilling the objects aimed at in anything

like the degree necessary to even approach our requirements. Moreover, the amount of land in this country upon which to rear young stock up to the age ready for fattening off is limited. We know that there were some 17,175,041 acres of arable land and 15,290,820 acres under permanent pasture thirty years ago in Great Britain, whereas to-day there are only 14,360,187 acres of arable land, or a decrease of land under crops to the extent of 2,814,854 acres, whilst permanent pasture has, on the other hand, during the past thirty years increased by 2,276,294 acres, thus making a total of 17,567,114 acres under pasture.

Again, it does not seem desirable that we should carry the breeding and rearing of live stock in this country too far at the expense of the production of other crops which are essential for the production of food for us besides providing food and bedding for the cattle produced.

(2) THE IMPORTATION OF FRESH, FROZEN, AND CHILLED MEAT.

It has already been pointed out that, although the annual imports of beef, mutton, and pork have greatly increased during the past twenty years, the rate of increase about twelve years ago rapidly slowed down, and that during recent years these imports have remained very nearly stationary. But considering the rate of increase of our population, and the failure of our home-bred stock to keep pace with the demands in the production of food, had it not been for the vast imports, the decrease in the proportion of meat per head per annum would have been far greater. Furthermore, we must remember that the future distinctly points to our not being in the "happy-go-lucky" position we were some ten or fifteen years ago, when we were practically the only customers for the large consignments of frozen meat turned out by American firms.

Amongst the countries exporting meat to the United Kingdom during recent years, perhaps the most important in point of quantities are to be found in the following order, namely: Argentina, Australia, United States of America, Denmark, and New Zealand. Now there are wonderful supplies of cattle and sheep in the British Empire over the seas. For example, in Australia, Canada, and New Zealand there are some 20,000,000 cattle, nearly 110,000,000 sheep, and nearly 4,500,000 pigs. In Australia and New Zealand alone there are about 107,750,000

sheep. In South Africa there are about 5,750,000 cattle, 30,000,000 sheep, and 1,000,000 swine.

As a matter of fact, we have, during recent years, depended considerably upon those sources for our supplies, consequently the imports of mutton from Australia and New Zealand have increased from 1,789,907 cwt. in 1904 up to 3,703,389 cwt. in the year 1914, or in the past ten years from about one-half up to nearly three-quarters of the total supplies of mutton imported into the United Kingdom.

The United States of America—with her population of 95,500,000 to feed—possess something like 57,750,000 cattle, 52,500,000 sheep, and 65,500,000 pigs. Instead of remaining a great source of supply, the United States appear to be gradually developing into a purchasing competitor, e.g., ten years ago one-half of the beef and about five-sixths of the live cattle and sheep imported into the United Kingdom came from the United States, whereas during the year 1914 only 1,707 sheep and lambs, no cattle, and only about one-hundredth part of the beef imports came from that country.

In the United States cattle have been greatly reduced in numbers during recent years, namely, from 71,000,000 in the year 1909 to about 57,750,000 in the year 1912.

Argentina, with her 28,750,000 cattle, is no doubt the greatest exporter of beef at the present time, and her customers, like the prices of meat, seem to be on the increase.

Italy, having joined the Allies, has decided to import large supplies of frozen beef in an endeavour to save her herds. France, besides having arranged with England for the delivery between February, 1915, and February, 1916, of 231,107 tons of frozen meat, is also arranging for the importation of large quantities of chilled meat. These countries may require to import considerable quantities of frozen and chilled meat for some time after the War; in fact, there is every probability of the trade becoming, more or less, a permanent one.

The perfection of the cold storage system has created advantages and disadvantages. In the first place, owing to the fact that meat may be kept almost indefinitely, any country anticipating hostilities could store away enough to keep her going a year or two if necessary, without unduly drawing upon the herds she possessed. Perhaps the greatest disadvantage of the cold

storage system is that it might prove just too accommodating to large combines by enabling them to force the prices in any direction, excepting that which might prove detrimental to their own financial gain, by either flooding or starving the wholesale markets.

Providing that the interests of every unit of the British Empire are honestly and thoroughly promoted within, then there is no earthly reason why we should not only be in a position to supply ourselves with meat, but also to have enough to spare for export. So far as chilled and frozen meat is concerned we would have Australia, New Zealand, and eventually South Africa, as sources. On the other hand, we have, a comparatively short journey away, Canada, a vast country with wonderful possibilities for the production of vast herds. By way of assisting us to fight against a genuine shortage we must—if it is possible to guard against the introduction of contagious diseases—import live cattle, either fat or lean. Before dealing with that part of our subject, let me just refer to exactly the opposite condition.

(3) THE EXPORTATION AND IMPORTATION OF LIVE ANIMALS.

(a) *The Exportation of Live Animals.*

When one takes into consideration the gradual increase in the shortage of meat imports, the insufficient increase in the production of home stock, and the prohibition of the importation of live cattle for feeding or grazing purposes, one is almost compelled to believe that the combined effect of such circumstances justifies a halt in regard to the exportation of food animals.

In normal times trade through the exportation of live animals is not interfered with. For example, in the year 1913 no fewer than 6,551 cattle, 8,635 sheep, and 1,099 pigs were exported out of the United Kingdom. Of the total animals exported some 4,544 cattle, 6,799 sheep, and 1,093 pigs, valued at £384,809, went for breeding purposes, the remaining 2,007 cattle, 1,836 sheep, and 6 pigs, valued at £42,698, were exported for food purposes. The exportation of pedigree stock from this country to various parts of the world has been an important business for years, and the high prices obtainable have no doubt been the means, in many quarters at least, of stimulating still greater efforts in the improvement of the various breeds concerned.

(b) *The Importation of Live Animals.*

Under this heading it is proposed to deal almost exclusively with the question of

The Free Importation of Canadian Cattle.

The importation of live cattle from any specified country outside the United Kingdom, the Channel Islands, and the Isle of Man, to be disposed of in markets, marts, or other places within this country, either for grazing purposes or for slaughter, seems to be a question that a certain number of people, for some reason or other, appear to find it most convenient to deliberately refuse to consider.

It may be accepted that the chief, and perhaps the only legitimate reason, for not allowing the landing of cattle in this country for the purposes mentioned would be the existence within the particular country of export of one or more of the following diseases, namely :—

Kinderpest (cattle plague).

Bovine contagious pleuro-pneumonia, and

Foot-and-mouth disease.

We have within the British Empire an important country which can be justly singled out as a great imperial asset, not only in regard to the present, but particularly to the possibilities of the future, in the production of cattle and wheat, besides standing out as a fine example to the rest of the world on account of the unequalled standard attained in regard to the health of her live stock.

The country to which I refer is

Canada.

The Dominion of Canada, situated about 2,760 miles away, i.e., from Liverpool to Montreal, or a voyage of only a few days, is a vast country. It extends westward from the Atlantic Ocean to the Pacific Ocean, and northward from the United States boundary into the Arctic circle, and embraces a total area of about 3,729,665 square miles.

The opening of our ports to Canadian farmers would prove to be a great stimulus to the increased production of cattle.

Whilst endeavouring to demonstrate the desirability or otherwise of importing cattle from Canada for exposure at our markets, it will be necessary to carefully consider :—

I. The conditions as to animal diseases and their prevention prevailing in countries contiguous to Canada.

II. The desirability of increasing the production of cattle in Canada for export.

III. The health of live stock in Canada and the precautions adopted to prevent the introduction of disease into that country.

IV. Whether, during recent years, any contagious disease has been detected amongst animals landed in this country from Canada and the United States and subject to inspection and slaughter at the ports.

I. When considering the possibilities of disease being introduced by land, *i.e.*, into Canada over the southern boundary from the United States, it will be necessary to briefly examine the past records besides the methods adopted to prevent the introduction of disease into that country.

The regulations of the United States require, in brief, that all horses, cattle, sheep, and other ruminants and swine, must be inspected before they are admitted, and, in addition, that all ruminants and swine from any part of the world except North America shall be quarantined.

Furthermore, so far as the risk of introducing disease into the herds of the United States is concerned, that appears to be reduced to a reasonable minimum, for in the words of the Secretary of Agriculture in his Annual Report for 1912, "Owing to the existence of communicable diseases of animals among the live stock of various parts of the world, importations from over the seas have been mainly restricted to Great Britain, Ireland, and the Channel Islands." Finally, neither cattle nor sheep have been imported into the United States of America from any country other than Canada, Mexico, and the United Kingdom since the year 1910.

HEALTH OF UNITED STATES CATTLE.

Now as to the existence of disease in the United States of America. It is generally believed that rinderpest (cattle plague) has never appeared in that country, and that contagious bovine pleuro-pneumonia was eradicated from her herds about twenty years ago.

With regard to foot-and-mouth disease, it may be stated that since the year 1897 until about a year ago, outbreaks have

occurred only at two different periods, one in 1902-3 and the other in the year 1908. The latter outbreak was stamped out in a few months. Unfortunately, however, during the past twelve months several outbreaks have occurred, but are being energetically dealt with by their large staff of trained veterinarians.

In briefly comparing the occurrence of outbreaks, it may be stated that in the United States outbreaks of foot-and-mouth disease have occurred during five separate years since 1897, whereas in Great Britain, during ten separate years within the same period, a total of 219 outbreaks have occurred in forty-eight counties. Furthermore, as showing the stringent precautions adopted by the United States for the control and against the exportation of diseased animals, it may be stated that during the last thirty years, which more than covers the period referred to, no fewer than 8,025,008 cattle, 3,009,751 sheep, and 4,354 pigs have been imported from the United States into this country and slaughtered at the ports of landing, but in no instance was any one of them found affected with foot-and-mouth disease. And as foot-and-mouth disease is the disease that really matters, these facts ought to be sufficient to remove all prejudice against Canadian cattle, if that prejudice be based on the fact that Canada adjoins the United States.

II. The desirability of increasing the production of cattle in Canada for export will be obvious when one bears in mind the huge corn crops produced in that country. For example, it will be generally admitted, I think, that where large crops are expected from the land it will be necessary, in order to be permanently successful, to produce live stock from which to obtain the natural manure, otherwise you starve the land.

THE HEALTH OF ANIMALS IN CANADA.

Reference will be made to the three diseases in rotation.

(1) Rinderpest (cattle plague) has never been seen in Canada.

(2) Bovine contagious pleuro-pneumonia has never been seen in Canada outside of the quarantine station at Quebec. Many years ago a number of cattle exported from England to Canada were found to be affected with the disease while undergoing their period of detention in that quarantine. Those cattle were promptly slaughtered, and no further cases have been seen or heard of in that country. In the years 1893, 1894, and 1895,

however, four, six, and two Canadian cattle, respectively, were condemned at our ports as being affected, but the Canadian authorities hold that it was never shown to their satisfaction that these animals were suffering from contagious pleuro-pneumonia.

(3) Foot-and-mouth Disease.—This disease is always more or less rampant on the continent of Europe, and has caused considerable trouble in England and Ireland during recent years. One might say that it is, of all animal diseases, the most highly contagious or infectious. It is reported to have existed in the province of Ontario in the year 1870, and to have been stamped out without occasioning any great loss. Since then that disease has not been found anywhere in Canada.

Again, according to statistics issued by the Board of Agriculture and Fisheries, we find that from the beginning of the year 1885 to November 21, 1892, an approximate total of 674,685 cattle, to January 1, 1896, a total of 715,874 sheep, and to January 1, 1897, a total of 1,573 swine were imported into this country from Canada, and were free to enter our markets and pastures.

Since those dates, however, 2,121,871 cattle, 651,838 sheep, and 150 swine, respectively, have been imported from Canada, but all have been compelled to be slaughtered at the ports of landing.

Finally, notwithstanding the fact that during the past thirty years no fewer than 2,796,556 cattle, 1,367,712 sheep, and 1,723 swine have been imported into this country from Canada, yet, with the exception of the 12 cattle alleged to be affected with bovine contagious pleuro-pneumonia twenty years ago, in no single instance has any one of those 4,165,991 animals been found to be affected with either rinderpest, bovine contagious pleuro-pneumonia, or foot-and-mouth disease.

One must not, therefore, be surprised to find that the policy pursued on this side of the Atlantic has been successful in so disheartening the Canadian stock producers that they have gradually decreased their shipments, with the result that since the year 1913 neither cattle, sheep, nor swine have been landed in this country from Canada.

In conclusion there are two points to be considered, either or both of which one might anticipate being urged as reasons

upon which to base objections to the free importation of Canadian cattle, namely :—

(1) The shipping from Canadian ports of cattle brought direct by rail from the United States may be considered an objection. Any such difficulty need not arise, for it would be only a matter for arrangement by the Canadian Government either to set apart certain ports to be used for United States cattle and no other, or to prohibit altogether the transit of United States cattle to any port in Canada for shipment.

(2) It might be urged that United States cattle would probably be entering Canada from time to time, and be shipped from Canadian ports as Canadian cattle.

That difficulty could be eliminated by defining Canadian cattle as being cattle which had immediately prior to shipment been continuously within the Dominion for a period of not less than, say, three months, and that during such period had not been allowed to come in contact with cattle, other ruminants, or swine which had not been continuously within the Dominion for a similar period and under similar isolation. Besides being an additional safeguard—should that be considered necessary—such a definition might be a further incentive to the breeding and rearing of cattle within the Dominion for export to Great Britain.

However, although more evidence seems scarcely necessary, these suggestions are only made with the view of illustrating the fact that the further one studies the subject the more one is convinced of the complete absence of any good reason for prohibiting the free importation of Canadian cattle into this country.

—*Abridged for THE VETERINARY JOURNAL.*

G. M.

[Mr. Parker has been in correspondence with Mr. F. Torrance, the Veterinary Director-General for Canada, and, as a result, thinks that owing to the good health of Canadian cattle and the effective measures taken against disease, it would be safe to allow of their importation into this country.]

Clinical Note.

A SHORT NOTE ON TWO CASES OF COITAL OR VESICULAR EXANTHEMA IN THE HORSE.

By HORACE L. ROBERTS, F.R.C.V.S.

Ipswich.

(1) SHIRE stallion, 5 years old. I was called to this animal on May 22, 1914. I found the penis and prepuce swollen. On the former organ there were more than thirty flat ulcers, which, on removal, showed a deep red base. On the prepuce I counted ten similar ulcers. The animal was feeding well; temperature 101° F.; testicles were not swollen.

I gave a dose of physic, and had the affected parts dressed twice daily with hyperchlor. solution, 1 in 3,000.

Recovery took place in twelve days.

(2) Suffolk stallion, 4 years old. I was called to this horse this year. I counted thirty-five ulcers on his penis, but there were none on his prepuce; testicles were not swollen.

Treatment as in the above case; recovery in fourteen days.

Each of these stallions, six days previous to the appearance of the eruption, had served a mare which the leaders noticed to be suffering from leucorrhœa. Doubtless other practitioners have seen similar cases of the disease, but I am not aware that any cases of the affection in Great Britain have been recorded.

[This disease has been seen in France, Germany, Austria, Hungary, Denmark, and Scandinavia. Hutyra and Marek state that stallions or bulls may transmit it without themselves being affected, also that the spread of the disease is facilitated by the fact that affected females show in the early stages of the disease symptoms resembling the period of oestrus, and consequently are taken to the male. Cattle, horses, sheep, goats, and pigs are susceptible in degree in the order named.—Ed.]

Chemical Note.

HYPOCHLOROUS ACID SOLUTION.

AN EFFECTIVE AND INEXPENSIVE ANTISEPTIC PREPARATION.

By HORACE L. ROBERTS, F.R.C.V.S.

Ipswich.

(I) "ACCORDING to recent investigations, the hypochlorites are among the most potent germicides known, as compared with carbolic acid; for example, they are from 150 to 200 times more powerful. The fundamental weakness is that they rapidly lose strength in solution.

"Hypochlorous acid is more potent than its salts, and recent investigations have devised a method by which free acid may be employed as an antiseptic in the treatment of wounds.

" Finely pounded commercial bleaching powder (chloride of lime) and boric acid powder are mixed together in equal parts, and kept in a well-stoppered bottle away from daylight.

" To prepare the solution take 6 drm. and 15 gr. of this mixture and dissolve in 1½ pints of water. Shake well, and let it stand for some hours, decant off the clear fluid, and a solution of hypochlorous acid is obtained.

" The solution remains effective for three weeks to a month, and contains '5 per cent. of hypochlorous acid.'

" In this strength the solution applied to wounds kills organisms . . . with extreme rapidity, and causes no destruction of the tissue cells

" A free flow of lymph is also induced from the wound as part of the reaction of the tissues. (. . . .)

" The cost of a gallon of this solution is approximately one penny.

" The dry powder may also be employed for wounds; hypochlorous acid gas is then rapidly eliminated, and in larger quantities than from the solution.

" Its use is especially indicated in affections of the limbs and feet"

The above remarks are the greater portion of an Army circular.

(II) Wallis Hoare, in his " Veterinary Therapeutics," third edition, p. 852, says: " The employment of sodium hypochlorite, combined with boric acid, as a dressing for wounds, is worthy of consideration here, as the agent is comparatively cheap and easily applied, and this author quotes H. D. Dakin, who gave particulars of his preparation of the agent in the *British Medical Journal*, August 28, 1915. Having had my attention drawn to the germicidal properties of the solution, and in view of the impossibility of obtaining certain continental products, I have recently used the solution whenever possible in general surgical work.

" As an aseptic, I find that it is superior to carbolic acid solution or lysol in the treatment of recent wounds, both accidental and surgical.

" In neglected wounds which have become septic or in part necrosed, irrigation with the solution three times daily for a few days causes healthy granulation of the parts, and a marked reduction of the size of the surrounding swellings.

" My experience with the dry powder has not been so satisfactory; nevertheless, I believe hypochlorous acid is a germicide which should be given an extended trial by the country practitioner who is often called in when a wound is thoroughly septic."

PARLIAMENTARY.

IN the House of Commons, Wednesday, June 21.

FINANCE BILL: MOTOR CAR LICENCES.

On Clause 11 (increased duty on licences for motor-cars), Mr. Montagu asked leave to withdraw the Clause. He stated that in originally putting the Clause in the Bill, the Government desired that there should be a reduction in the unnecessary use of motor-cars, and as a result a reduction in the use of petrol. They sought to effect that object by the imposition of a very heavy duty, hoping they would thereby succeed in reducing the number of licences taken out. Since the Budget was introduced a new departure had been made by the Government which would enable the Treasury to achieve the same object in a fairer way. The Petrol Control Committee appointed by the Board of Trade intended, he understood, to introduce a central control of petrol stocks, which were to be distributed only under permits issued by the central authority. They were now obtaining from consumers the average of their past consumption and estimates of future consumption. On those estimates they would issue a permit to each consumer entitling him to purchase a specified number of gallons of petrol for a specified purpose and for a specified period. It was proposed that, in order to get a permit from the Petrol Control Committee, the consumer should have to pay a licence duty of 6d. for every gallon which the permit enabled him to obtain. If he did not take the quantity of petrol out in the time he would be entitled to a refund. Commercial cars, doctors' cars, and cars used by veterinary surgeons would get their permits at half rates. A new resolution embodying the scheme would be introduced to-morrow.

Sir R. Finlay (Edinburgh and St. Andrews Universities, U.) remarked that the Government's proposal seemed to involve that surgeons and veterinary surgeons should be entitled to the abatement of one-half of the duty upon cars granted to doctors under the existing law. There was a strong case for a similar abatement being granted to clergymen, of whom he knew one who had a parish sixty miles long.

Sir F. Banbury (City of London, U.) remarked that if the suggestions which had been made were adopted there would be no revenue from the tax. He agreed that doctors and veterinary surgeons should be granted an abatement; their work was to alleviate suffering; but local authorities often caused suffering.

Mr. Montagu suggested that it would be better to keep separate the consideration of the permanent and temporary taxation on motor-cars. There were certain taxes on motor-cars which formed part of the ordinary revenue. But the tax now under consideration might be called a supertax on motor-cars for the duration of the War only. It was proposed to levy it in its new form by a temporary body, which would issue permits under the Defence of the Realm Acts.

Question: "That the Clause stand part of the Bill," put, and negatived.



CAPT. J. J. DUNLOP, A.V.C. (S.R.)

*Awarded the Military Cross for bravery in rescuing wounded under shell fire.
(See p. 282.)*

THE
VETERINARY JOURNAL

AUGUST, 1916.

Editorial.

AFTER THE WAR.

IN the Press and in all places where men congregate—at the club, in the market and in Parliament—the phrase “after the War” is being used in reference to future contemplated actions. It is assumed rightly that it will be wise to put forth all the energy and scientific acumen we are capable of in order to hold our own in productive, trade, and financial circles. The business, to be carried out satisfactorily, will have to be in the hands of master minds and a willing people. The welfare of every section of the community will be bound up in intelligent, forceful, energetic and scientific plans of organization and advance for the future. The veterinary profession will be chiefly concerned and interested in the expansion and re-animation of agriculture, although the prosperity of all activities will affect it materially. The revival of agriculture means men for the land and land for the men, security for the farmer, good wages for the agricultural labourer, more scientific methods of cultivation, more breeding of live-stock, and, if effort and not drift is to be essential in the matter, an adoption of the recommendations of the Minority Report of the recent Government Committee appointed to consider the settlement and employment on the land of discharged soldiers and sailors. It is no use writing or talking about methods to be adopted “after the War” if we only revert to a continuance of ways and means prevalent “before the War.”

The initial step in any agricultural revival lies with the Government. We are always *led* by politicians. Whether it is the best way or not, the fact remains. When will the people recognize the full force of this, and that it is they who elect their leaders? In dealing scientifically with the agricultural question, we want a great awakening to the importance of the matter among the whole Parliamentary body. Then we need an enthusiastic discussion and carrying out of the best measures to stimulate and increase the output of live-stock

and farm produce. Agriculture seems to be one of the domains whose welfare, stability and progress ought not really to depend on politics and vote-catching. The questions of its encouragement, fostering and flourishing are national and not party ones and should be dealt with nationally. The movement, to be successful, must not be crippled at the start by niggardly finance.

The bearing of education on agricultural matters needs looking at from a new view-point. The Minister of Education ought not to be required to devote his time chiefly to keeping peace in the Labour world, but to effect real progress in education, to spend his days and strength solely in service for the improvement of scientific and technological instruction. The improved education of the agricultural labourer so as to enable him to understand the scientific principles and methods on which the most modern cultivation is based, is one of the concerns of this chief. A steady supply of able, well-trained and zealous peasantry is needed. A direct application of rural teaching to the problems of the land, and a wise continuance of the education so as to interest and profit those going on the land is necessary. The farm school should be fitted to turn out practical and intelligent agriculturists and cultivators.

The creation of a Ministry of the Interior, as in France and Germany, would benefit agriculture and give it some of the required stimulus and help those who depend on the good state, liveliness and soundness of the industry for their support and livelihood are entitled to expect.

The national indifference to education, however, is very pronounced in our country, Scotland alone taking much interest in educational advance. If shibboleths and parrot cries, far too numerous in the past, are not to take the place of real, discerning effort, then there is serious, solid work to be done. The task is not trivial and insignificant. It means, for the most part, a change of heart and faith in the proletariat. It is a labour for giants in thought, organization and scientific discernment. If half the organizing ability expended in the obtaining of men and munitions for the War is spent "after the War" in measures to increase real live agricultural workers and peasant production then true advance will be made. The industry can never flourish as it should do unless a measure of the zeal, attention, and acumen evident in the present warlike operations is passed on "after the War" to the forces dealing with crop and live-stock production.

We trust that the British public will falsify Mr. G. Bernard Shaw's opinion and want many other things besides the one indicated in the answer to the following query: "Do you think that the War will make the British public want anything violently after it is over?—Yes, beer!" We hope that one of the things it will make a large number of them eager for will be land and work on the land. We desire, too, that what they may get through the politicians and the Treasury will be something more tangible and less illusory than the satisfaction of the M.P. "who heard an honourable Member smile."

We think veterinary surgeons ought to urge on their M.P.'s the importance of increasing agricultural and stock output. It is really far more vital to our welfare than the abatement of pains and penalties attached to the possession of a motor-car.

G. M.

Original Communications.

MOLLITIES OSSUM IN A "SHETLAND PONY": RÉSUMÉ OF DISEASES OF BONE NUTRITION.

By F. C. MAHON, M.R.C.V.S.

Chiswick, London, W.

(I).

DISEASES of bone nutrition, otherwise known as non-inflammatory diseases of bone, occur occasionally in the domesticated animal, but apart from the dog, whose chief disease is "rickets," rarely osteoporosis, we chiefly find such disease relegated to the equine.

Reviewing (1), *fragilitas ossium or excessive fragility of bone*, proceeding (a) from changes in the animal matrix, (b) changes in the inorganic materials. The latter form is usually related to some antecedent inflammation of the bone; the cause of the former is not yet well made out. I have encountered this affection in marshy, low-lying country districts, especially parts of Somerset.

(2) *Rickets*.—Also a disease of nutrition affecting frequently the entire body, soft, as well as hard structures, therefore difficult of differentiation from that of *mollities ossium*. Rickets is characterized chiefly by delayed or arrested ossification: that is, true bone formation is rare except in parts. *Mollities ossium*, I take it, is true bone formation, undergoing subsequent changes of a characteristic nature, and a rare affection indeed. The causes of rickets are: (a) previous inflammation of bone. (b) Calcareous matter not deposited in sufficient amount. (c) Lime salts subject to excess of removal from peculiar changes occurring in the body. Debilitating influences, as defective dietary, bad sanitation, overwork, being chiefly responsible for its occurrence in our patients. The symptoms are in intimate relation to the physical, chemical, and histological

changes, which occur in the bones of the extremities, or in visceral structures affected in a direct or indirect manner.

(3) *Mollities Ossium*.—The subject chiefly of this article, and explanatory of my case, known as bone-softening, also as fatty or gelatiniform degeneration of bone. It is peculiar as to its subjects, attacking mares that are well advanced in gestation.

The process of decalcification commences in the interior of the bone, then extends outwards, the vascular and tubular elements undergoing the most marked alteration, with rapid cell production. Its results are increased liability to fracture, rather than bone-flexion.

The exact changes which occur in this state are not well understood, neither are the means which tend to ward it off satisfactorily determined.

(II).

(4) *Osteo porosis*.—This is the term which has been applied to rarefaction of bone tissue, increase in bulk without increase in actual weight. The pathology is not well understood, and its causation is largely a matter of supposition. Certain facts are, however, well known, but their relation to the progress of the disease uncertain.

It has been spoken of as rickets of adult animals, to which disease of bone nutrition it bears a close resemblance. Unlike rickets of the young, it shows less disposition to invade the bones of the extremities. In all cases it exhibits a preference to become located at an early stage of the disturbance in the bones of the head. When fully developed the physical characters of the bones change, the ends enlarge and lameness is a prominent feature. Besides the rarefaction of the true bone structure, the cartilages of incrustation are eroded, the periosteum and synovial membrane surrounding joints thickened, and of increased vascularity. The treatment, like its etiology, is very unsatisfactory.

(5) *Medullary, or Fibro-plastic Disease of Bone*.—This affection of bone tissue in the horse is chiefly encountered in the facial bones and in those originating in the interior extending outwards and invading the compact shell when fully developed. Its causation, although occasionally traceable to external violence, is more dependent upon indwelling predisposition.

In its entire clinical history malignancy is rather distinctly marked. Heredity is closely associated with its appearance, and it is disposed to extend more rapidly when surgical interference is adopted. Some cases of this have probably been confounded with the parasitic affection "actinomycosis." Treatment is unsatisfactory, seeing that attempts at cure are apt to be followed by more rapid spread of the affection.

These five bone diseases and conditions in many particulars closely approach one another, and it is only by *post-mortem* and microscopic examination one can determine their existence and differences.

Briefly I now pass to consider the case forming the title of my paper, and endeavour to show why I classify the same under the title and disease "Mollities Ossium." I tabulate the structures chiefly invaded by cancerous elements, viz., the epithelioma; (ii) scirrhous, fibrous, or chronic cancer.

(1) EPITHELIOMA.

Characteristics.

Form : often friable.

Section : greyish-white when intersected with lines of fibrous tissue—turbid, liquid, crumpled, curdy.

Affects cutaneous or mucous surfaces.

Lower lip, anus, prepuce, muscle.

* Bone, tendons, lymphatic glands.

Rare in internal organs (man).

SCIRRHOUS, FIBROUS OR CHRONIC CANCER.

- (1) Large amount of stroma.
- (2) Chronicity of growth.
- (3) Rapid atrophy and progressive changes.
- (4) Takes part in external parts generally.
- (5) Cicatrization goes on, and the tumour becomes somewhat indurated.
- (6) Causes obstruction and obliteration of blood-vessels, hence assists in development.
- (7) On section : greyish-white, juicy granules, mucous cells possessing free nuclei.
- (8) Female breast : alimentary canal, oesophagus, pylorus, rectum, skin.

The history of the case briefly is as follows : on November 20, 1915, I noticed that the pony was fading somewhat, his muscular movements slower, and the gait, particularly the near fore and off hind limbs, thrown forwards and outwards at the walk. His exercise was stopped owing to a two months' illness of the groom, the wintry weather and excessive damp. In February his coat became shaggy, and appetite capricious. Lameness of a rheumatoid-arthritis type. Temperature never more than 101·5. He was moved about half a mile from home for a few days, but refused food, had a sore throat, occasional cough, and generally unthrifty. No quidding of food, no salivation. Lay down a great deal. Testicles more or less swollen, orchitis being chiefly shown.

On March 15 I noticed a protrusion forwards and laterally of the superior maxillary bones, with tenderness on percussion. No nasal discharge. No tension on heart and respiratory apparatus to cause undue alarm.

He was ridden but twice to my knowledge, with ordinary weight of a child aged 7. His off hind leg from this time almost seemed as if it did not belong to him.

He was sound on April 22. Dead lame off fore 24th of the month. From this time he declined visibly. Recently he was clipped, and owing to presence of lice (a few being found, but many eggs) washed with potash (sulphurate); lastly, mercurial soap a few days before being destroyed.

On June 8 I found him recumbent; I tried raising him, but his quarters sank and no weight could be placed on off hind limb. He sank on left side, and when destroyed was practically comatose.

Post-mortem examination revealed a staggering condition of things :

The liver, spleen, serous covering of colon affected with growths; the colon and cæcum showing partly calcified globular bodies, shelly, and full of pus.

The pelvis and lumbar regions apart, with softening of last lumbar vertebrae, with spicules of bone, and an abscess which had burst on the spinal cord.

The near fore-limb. Head of humerus fell off the humerus itself on making the *post mortem*. His ribs elastic and could by slight

pressure be twisted as desired. The superior maxillary bones outwardly are worthy of note.

MOLLITIES OSSIUM.

Definition.—An abnormal softening of bone, due to the presence of a largely preponderating quantity of animal matter, with a small amount of earthy material within the bone substance.

It is very difficult to say what causes operate in the production of this disease; probably the food and water have something to do with it. It is also very possible that a predisposition to the disease may be transmitted by a sire or dam to the progeny. Its presence is thought by some veterinarians to depend upon, or to be connected with melanosis.

(Smith) "There was a grey horse brought to the infirmary a few years ago that was suffering from this disease, and it was at first thought that the trouble was due to carious teeth, but afterwards the true condition was discovered. It was a case of *Mollities ossium*. The bones of the jaws were very soft and cartilaginous, and in this case, at least, I think it was due to a melanotic condition."

Symptoms.—There may be difficulty in mastication, which gradually becomes better marked as the disease progresses. The bones become more or less enlarged, and take on a soft and cartilaginous character, and there may also be a discharge, which is usually profuse and of a very offensive character.

EPITHELIOMA.

Form, often friable.

Section : greyish-white when intersected with lines of fibrous tissue—turbid, liquid, crumby, curdy.

Affects cutaneous or mucous surfaces.

Lower lip, anus, tongue, prepucce.

Muscle—bone,* tendons.

Lymphatic glands, rare in internal organs (man).

SCIRRHOUS, FIBROUS OR CHRONIC CANCER.

Characteristics.

- (1) The large amount of stroma.
- (2) Chronicity of growth.
- (3) Rapid atrophy and progressive changes.
- (4) Takes place in external parts generally.
- (5) Cicatrization goes on, and tumour becomes somewhat indurated.
- (6) Causes obstruction and obliteration of blood-vessels, hence assists in development.
- (7) On section : greyish-white, juicy granules, mucus cells possessing free nuclei.
- (8) Female breast : alimentary canal, cesophagus, pylorus, rectum, skin.

In man the acute infections (osteo-myelitis, and periostitis) caused by cocci, staphylococci *Pyogenes aureus* and *albus*, in the blood of the marrow, or periosteum, particularly in the femur, and tibia are found. These organisms are by many doubted as occurring in the horse, but there is grave doubt but that they play a great part in the progressive changes that are found in bone-diseases, especially the one under consideration. Progressive cachexia was a marked feature in the case of the "Shetland pony," and general anaemia pronounced. The pulse (submaxillary) varied from forty-five to seventy per minute. Temperature: highest 103·2° F.; lowest 99° F.

* These are the two forms which bear on and are to be considered in Joey's case, and are taken from Notes, 1883, and delivered Royal Veterinary College, by Professor W. Robertson, F.R.C.V.S., and Professor Brown, C.B.—Bd.

Uric acid predominated in the urine, distinctly acid in reaction, and at times the liver complications shown by an intense yellowness of conjunctivæ, nostrils, lips, and even palate were observed.

The large intestines, mesenteric artery, showed the presence of the blood-sucking helminth, *Strongylus armatus* (palisade worm). Several foreign bodies were found, and calculi in process of formation, resembling coal with iron intermingled. The lymphatic glands (calcified) hard in some few as a marble, and when broken, or cut into contained pus in majority of instances. Up to the summer of last year the pony seemed in fair health, beyond catarrh and laryngitis I do not know of any ailment affecting him hitherto. Orchitis was present for weeks on and off, which I attributed to a rheumatic tendency. On *post-mortem* examination I found the parasites in the spermatic cord and testes.

Dr. Cobbold, M.D., Lecturer on Helminthology, Royal Veterinary College, London, Lecture XVI, 28th November, 1883, when I was his monitor, stated: "*Strongylus armatus major* has been found in the testes."

During the efforts of the palisade worm to reach the intestines, they occupy several tissues of the body, producing much injury and consequent suffering. When arriving at sexual maturity they live in faecal matter, in fact become dung feeders. They anchor themselves to the gut, in order to escape being ejected during the passage of the faeces, *via* intestinal canal, and per rectum finally.

A great deal of what is known of this notorious parasite, often overlooked or unsuspected, is due to Professor Rudolf Leuckart. The parasite in its active wanderings is the immediate cause of the formation of aneurysms, from whence by means of the complicated mouth armature they bore their way into the intestinal canal, where they at length acquire full sexual maturity and growth generally. The previous history of the pony was unknown to me, but I cannot help believing that the numerous parasites found, the gradual wasting of muscular structures, the ephemeral lameness, met with, and other clinical symptoms, that the same were due to the invasion of the system of the pony by the palisade worm, and brought about finally many of the changes in bone and other structures found on *post-mortem* examination. Section and staining of several parts of the bones and viscera by my friends revealed cancerous elements of an "epitheliomatous" nature. The case in my opinion is most rare and I should be pleased to know whether such have been encountered in the Shetland pony hitherto.

The causation is evidently attributable to some rather ill-defined impairment of general nutrition. It is most frequently found where debilitating influences, as defective dietary, bad sanitation, over-work, are in operation in either parent or progeny. That there are physical, chemical, and histological changes is undoubtedly, and were shown markedly in my case.

I consider the confinement, damp weather, absence of sunlight, sex and hereditary influences each bear their share in so marked a case of mollities ossium. I regret I was unable to trace any weakness in the strain from which this pony came, but brought south from native haunts, fauna, and in many cases living a life free yet fettered, would I think in a decade lower vitality, and with hidden

causes at work bring about dire results. Had my patient had regular exercise, or roamed about the heaths of the New Forest, fed on bracken, moss, ferns, and on a sandy soil, I venture to add that his life would certainly have not been prematurely cut off. When soil, food, and water upon which animals are reared, are changed for artificial surroundings, nature must be altered, a fact with which I think most of my readers will agree.

The part played by adventitious cell-growths of a malignant (cancerous) nature, the advent of actinomycetes, the part too played by pus-forming organisms ought also to be duly considered in studying and combating what are very interesting cases, viz.—inflammatory, (2) non-inflammatory, (3) congenital malformations of the bones of the skeleton.

With this diversified article I close my book so to speak, feeling assured that it will receive at the reader's hands kindly consideration and due thought. As far as we know, many features of these diseases still lie hidden and neither the scientist, chemist, nor agriculturist can altogether satisfactorily explain them.

NOTES ON AN OUTBREAK OF POISONING AMONG HORSES.

BY R. C. G. HANCOCK, B.Sc., M.R.C.V.S.

AN outbreak of poisoning occurred recently in a Battery under my care, under the following circumstances:—

On May 22 and 23 the Battery marched eighteen and twenty miles respectively with the rest of its Brigade, arriving at its destination about 5 o'clock on the 23rd.

I was summoned on the morning of the 24th to see an A.S.C. horse (Case 1) of the Battery, and on arrival at 9.30 a.m. found it standing in a farmyard, head outstretched, in a urinating posture, some dyspnoea; respirations 60; pulse tumultuous; rate 70; temperature 102°; patchy perspiration. On moving, the gait, particularly of the hind limbs, was inco-ordinate, the condition being very reminiscent of a cow in the early stages of milk fever. Inquiry showed the horse had refused its morning water and feed. Liquid green faeces were noted to have been passed in small quantities at frequent intervals, and a small dejection occurred during my examination, after which nothing more was passed up to the time of death. During my examination the horse was obviously getting worse, and showing signs of falling, with incipient paralysis of the hind limbs.

He was led on to straw on the midden heap, where he soon fell down, and never rose again. Exhaustion from the march, laminitis, tetanus, azoturia, were all excluded one by one, and poisoning seemed the most likely diagnosis.

At 10.15 a dose of arecolin (2 gr.) was given, and beyond causing great pain, salivation, and increase of sweat, no defæcation occurred. Apparently, then, the paralysis of the hind limbs had been followed by that of the bowels, a fact corroborated by the absence of peristaltic sounds through the abdominal wall, and later further established by the fluid condition of the bowel contents found at *post-mortem*.

At 10.45 the pulse could not be taken owing to muscular twitching and the extreme rapidity of the beats. The heart-beats were audible several yards from the animal, and one hundred and twenty were counted in a minute. Temperature 105° F. Death occurred at midday. The *post-mortem* conducted during the afternoon showed the following :—

Liver, spleen, kidneys, and lungs normal. Stomach empty, the whole of the intestinal tract was free from inflammation. Careful search failed to find anything abnormal in the bowel contents, which were completely fluid, dark green in colour, and frothy.

The pericardium contained at least 6 oz. of yellow, semi-transparent fluid, but some escaped when the sac was opened, so probably half a pint was present.

Several horses were reported off-feed in one sub-section of the Battery at this time, but I was inclined to put this down at the time to the effects of the march, many of the horses being in poor condition.

Next morning, the 25th, ten horses in all were off-feed, one being down, having, like the previous case, developed paralysis of the hind quarters. This horse (Case 2) was not given arecolin, and no faeces were passed after he went down, although he, too, had diarrhoea at the outset. The subsequent symptoms and course were exactly the same as in Case 1. *Post-mortem* showed only frothy, dark green, completely fluid bowel contents, and 8 oz. of fluid in the pericardium. The stomach was full in this case.

Three more horses were reported off-feed during the afternoon.

The second death, together with a number of other horses off-feed, called for investigation, and I rode over to report the matter. On my return in the evening I found many of those off-feed showing staggering gait; some had slight heat in the feet.

Case 3 was prostrate, respiration and pulse accelerated;

temperature 103° F. I sent an orderly for a supply of arecolin, determined to give every horse a dose forthwith. The arecolin arrived by midnight, and every case received 2 gr. subcutaneously (Cases 3 to 15, thirteen horses). It acted throughout with great rapidity, every horse purging strongly within ten minutes.

Next morning, the 26th, at my first visit, every horse was grazing, and evidently on the road to recovery, except Case 3, which, although considerably better, still refused food.

Case 5 was also off-feed and dazed, but started feeding towards evening. The inco-ordinate gait had disappeared also, except in these two cases, and they were both staggering slightly behind, showing unwillingness to stir without a whip.

All were turned out into a grass field.

One now felt that the trouble was over, and I personally felt annoyance at being unable to find the cause despite two *post-mortems*. The watering places on the march, any unusual occurrences in the particular sub-section of the Battery—for, with the exception of four horses (Cases 8, 10, 11, and 15), all came from one sub-section—were ascertained with no result.

The food was examined carefully, poisoning by castor-oil beans being the most favoured theory.

On the morning of the 27th, the Battery was at driving drill, and about 8.30 a.m. I was summoned to a horse that had dropped dead in a team without premonitory signs, after marching some two miles from the wagon lines. The *post-mortem* was conducted on the spot and the following notes were made :—

Case 16.—Stomach full, mucous membrane showed no inflammation. Small intestine—from the pylorus for a distance of 15 ft. there was slight inflammation, evenly diffused throughout, contents of this portion were yellow and fluid. Three inches from the pylorus there was an ulcer, the size of a sixpence, undergoing cicatrization. Remainder of small bowel normal. Cæcum full, contents fluid. Large bowel full of oats, hay and grass, mucous membrane throughout this and remainder of bowel free from inflammation. Liver, spleen, kidneys, lungs, heart, larynx, all normal. Pericardium contained about 4 oz. of yellow semi-transparent fluid.

Case 17.—At 11 o'clock I was again summoned, this time to the wagon line ; just after watering another horse had fallen dead, without showing previous illness. *Post-mortem* made during the afternoon showed the following :—

Stomach—villous portion reddened and congested with small areas

of erosion. Small intestine normal. Cæcum at its tip markedly engorged and inflamed, no ulceration. First portion of large colon showed uniform inflammation. Other organs healthy, save that, as in all other cases, several ounces of pericardial fluid were recovered. A piece of stomach and cæcum and their respective contents were secured for examination and analysis.

At this time Case 3, which had lingered for two days, being *in extremis*, was shot. *Post-mortem* was as follows:—

Stomach—generalized inflammation of the villous portion, with seven distinct though shallow crateriform ulcers scattered over the surface. Bowel inflamed in patches throughout, notably the cæcum. Large colon showed corrugation, and slight induration. Contents of large intestine completely fluid. Remaining organs healthy, but pericardium contained over 8 oz. of fluid similar to the other cases. Portions of stomach and cæcum, together with their contents, were also sent for analysis with the material in Case 17.

No more cases occurred, and of the seventeen, five succumbed, seven were cured and are still with the Battery; the remaining five were evacuated to a convalescent depot, being judged unfit for service for some time.

The report from the laboratory was as follows:—

"No metallic poisons were found, but the stomach contents labelled No. 91, (*i.e.*, Case 17, that died after watering) contained leaves and twigs of yew, and also a small amount of a substance giving the reactions of alkaloid. The amount of this substance was too minute for identification."

One must therefore assign the cause of the outbreak to yew.

The contents of the bowels of Cases 1, 2, and 3 were carefully examined by me, and I feel sure that any reasonable quantity of yew must have been detected during that examination.

The bowel contents of Cases 16 and 17 were not examined in detail by me.

That yew was not found in Case 16 at the laboratory may be explained by the fact that the case lasted over two days, thus giving time for digestive changes to render the yew unrecognizable. Presumably the yew must have been gathered during the march, at one of the hourly halts. No one in the Battery remembers halting by a yew hedge, and when returning along the same route, we failed to find yew where the Battery had halted on the previous journey. There was no yew accessible to the horses where they were picketed after their arrival on May 24.

I append a table giving a résumé of the cases.

In conclusion, I must express my great indebtedness to Sergeant W. E. Golden, A.V.C., who was of great assistance in the making of the *post-mortems*; who spent two days and nights in constant attendance on the cases, depriving himself of sleep until the less affected horses were out of danger.

SUMMARY OF CASES.

No. of case in order of occurrence	Sub-section of Battery	First noticed ill	Treatment	Remarks
1	A.S.C.	6 a.m., 24th	Arecolin, 2 gr., 10.15 a.m.	Died, 12 midday, 24th.
2	" B "	6 a.m., 25th	None	Died, 1 p.m., 25th.
3	" B "	Early 25th	Arecolin, 2 gr., midnight, 25th-26th	Died about midday, 27th.
4	" B "	" "	Arecolin, 2 gr., midnight, 25th-26th	Convalescent by 27th.
5	" B "	" "	Arecolin, 2 gr., midnight, 25th-26th	Cured.
6	" B "	" "	Arecolin, 2 gr., midnight, 25th-26th	Convalescent by 27th.
7	" B "	" "	Arecolin, 2 gr., midnight, 25th-26th	Evacuated to convalescent dépôt.
8	Quartermaster's horse. " D "	" "	Arecolin, 2 gr., midnight, 25th-26th	Convalescent by 27th.
9	" B "	" "	Arecolin, 2 gr., midnight, 25th-26th	Cured.
10	V. Sergt. " A "	" "	Arecolin, 2 gr., midnight, 25th-26th	Convalescent by 27th.
11	Sergt.'s " D "	" "	Arecolin, 2 gr., midnight, 25th-26th	Cured.
12	" B "	" "	Arecolin, 2 gr., midnight, 25th-26th	Convalescent by 27th.
13	" B "	Afternoon of 25th	Arecolin, 2 gr., midnight, 25th-26th	Evacuated.
14	" B "	" "	Arecolin, 2 gr., midnight, 25th-26th	Convalescent by 27th.
15	Outrider. " C "	" "	Arecolin, 2 gr., midnight, 25th-26th	Cured.
16	" D " (lent to " B " for parade)	Not noticed before death after march of two miles	Nil	Died on parade 8.30 a.m., 27th.
17	" B " (fellow horse to No. 16 for that parade)	Nothing noticed before death	Nil	Died after watering, 11 a.m., 27th. Yew found in stomach at <i>post-mortem</i> .

Selected Article.

CLINICAL LECTURE ON THE CASE OF A COW, A HAT-PIN, AND A BAILIFF.*

By SIR JOHN BLAND-SUTTON, F.R.C.S.

Surgeon to the Middlesex Hospital; Major R.A.M.C.

(Reprinted by permission from the *Medical Press and Circular*,
June 14, 1916.)

IN order to make the points in this lecture clear, it will be necessary to describe the anatomical features of the stomach of a ruminant, for the patient was a cow.

The stomach of oxen is very complex (fig. 1). It contains four compartments. Of these, the first is a large receptacle called the rumen or paunch. The second is a smaller compartment, or recess, closely connected with the rumen and known as the reticulum; this, when cleaned, becomes honeycomb, the choicest kind of tripe. The reticulum receives the food from the gullet.

The third compartment, called the omasum, may be described as a dilatation of the canal between the reticulum and the abomasum; it is ovoid in shape and as big as a man's cranium. The walls of the omasum are thick and muscular, and its mucous membrane is arranged in folds, or leaves. Nearly a hundred folds hang from its dome; they stretch from the oesophageal opening to the entrance of the abomasum. The folds vary in depth (fig. 2), and produce an appearance like that of the flies of a theatre seen from the stage. These folds earned for the omasum the name of manyplies, and psalterium, from the likeness to a book. Butchers call it the bible.

Ellenberger (1881) investigated the structure and function of the omasum and described it as a triturating apparatus, or masticatory stomach. The leaves near the entrance are furnished with long warts or papillæ, resembling the teeth of a harrow; their hard, horny points are so arranged as to hinder the reflux of food to the reticulum. Towards the abomasum the papillæ are shorter, closer set, flattened, and resemble the low elevations of a rasp,

* Lecture delivered at the Middlesex Hospital.

or a file. The covering of the leaves is hard, almost horny, and very resistant to dilute solutions of acids, alkalis, and peptic juices. The walls of the omasum contract powerfully. Food between the leaves is thoroughly rasped by the papillæ before it enters the abomasum, the true digestive compartment.

After death the omasum is firmly contracted, but the walls of the other compartments of the stomach are relaxed. The stomach generally is under the control of the pneumogastric nerve, but Ellenberger found that stimulation of this nerve has no influence on the omasum. Nerve plexuses and multipolar nerve-cells are present in the walls of the omasum, but no ganglia.

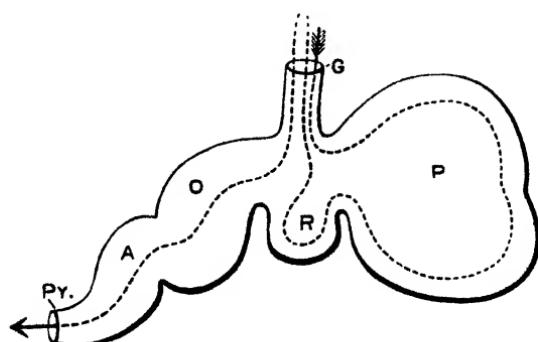


FIG. 1.—A diagram of the four compartments of the stomach of an ox. The dotted line shows the track of the food.

G. Gullet. P. Paunch or rumen. R. Reticulum. O. Omasum. A. Abomasum. Py. Pylorus.

The fourth compartment, known as the abomasum, is the true stomach; its glands secrete gastric juice. This acid secretion is called rennet. Dairymaids use the rennet of calves for curdling milk, the first step in cheesemaking.

It is useful to compare the stomach of a calf with that of an ox. In the new-born calf the fourth compartment, or abomasum, is larger than the rumen (fig. 3). A few months after birth, when the calf feeds on grass, the rumen enlarges rapidly, and in eighteen months the relative sizes of the various compartments are as follows: Rumen, 80 per cent.; reticulum, 5 per cent.; omasum and abomasum nearly equal each other—together 15 per cent. The tooth-like papillæ around the entrance of the omasum are very conspicuous in a calf a few weeks old.

When the cow feeds she encircles the grass with her long, prehensile rough tongue, and tears it off. Moistened with the saliva, the bolus of grass is conveyed by the gullet to the paunch. The fluid in the paunch consists of saliva, which is freely secreted, and water. In the paunch the food is macerated in an alkaline medium, assisted by the churning movements set up by the muscular tissue in its walls. Cows, and especially calves, lick and swallow hair from their hides; the churning of the contents in the paunch causes the hair to felt and form balls, often

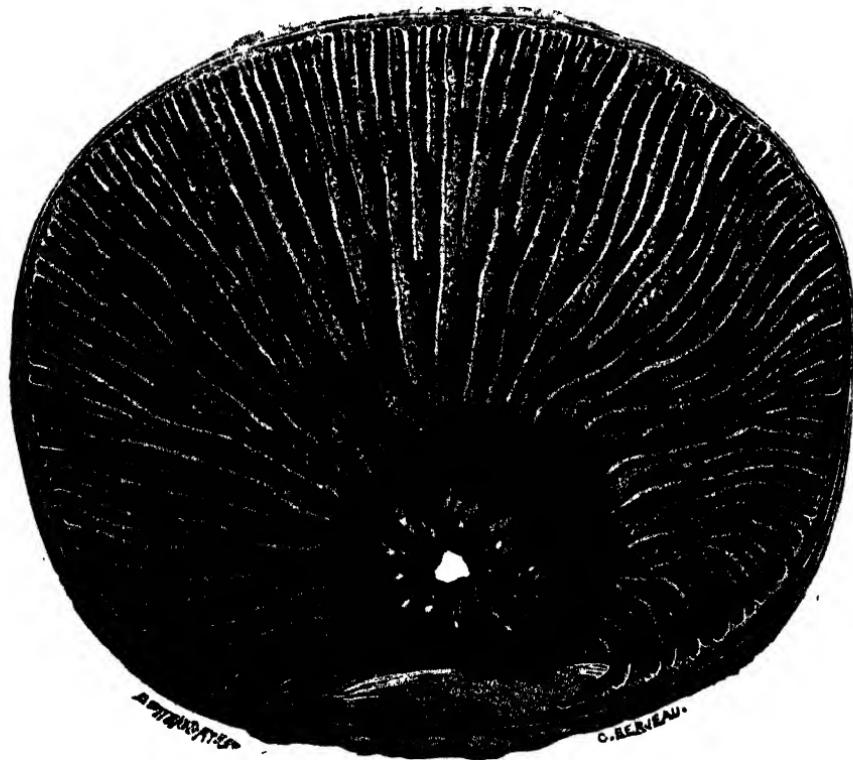


FIG. 2.—The Omasum (Psalterium or manyplies) of an ox in transverse section, showing the large papillæ at the orifice leading from the recticulum. ($\frac{1}{2}$ nat. size.)

called ægagropiles. The Hospital museum contains some good examples.

When feeding, cows often swallow odd things that may be lying in the grass, such as a frog, a purse, or a tobacco pouch; garters, bracelets, crosses and similar trinkets dropped by lovers;

darning needles, knitting needles, sewing needles; crochet hooks, button hooks, wire, forks, nails, blades of knives, scissors, and hymn books. The capacity of a cow's stomach is about 20 gallons.

When the cow has satisfied her appetite she lies down on one side, generally in the shade; then an apparently involuntary twitch of the flank sends a bolus of grass up the gullet, by reversed peristalsis, into the mouth. This bolus, probably moulded and ejected into the œsophagus by the reticulum, which is capable of energetic contraction, is ground fine by the molar teeth, mixed with saliva, and re-swallowed. This grinding act is known as rumination. The weight of the bolus is about 4 oz., and the time occupied in each act of rumination nearly a minute. A painstaking observer calculated that the cow spends about seven hours out of twenty-four in ruminating.

When the food returns to the stomach some falls into the rumen, but much of it goes into the reticulum and the omasum, thence onward to the abomasum, where it comes into contact with the gastric juice. The larger portion of the ruminant's stomach is like a pocket, non-digestive.

These facts prove that grass is not digested in the same way as a mutton-chop.

It must be obvious to anyone who clearly grasps the disposition of the various compartments of the stomach of an ox that elongated foreign bodies, such as wire, hat-pins, needles, and blades of knives, when swallowed, will have some difficulty in threading the maze offered by the omasum. An ordinary sewing-needle would easily enter. I have seen one stuck in a leaf of the omasum. Needles and wire often get into the reticulum, and the forcible contractions of its walls cause a pointed body to penetrate and find its way through the diaphragm into the pleura, the pericardium, the heart, or the lung. Sometimes such sharp things are forced into the belly. Such accidents often lead to infective changes that end in death.

Veterinary surgeons who have studied these conditions, realizing the frequency with which such dangerous foreign bodies are retained in the reticulum, have approached this compartment of the stomach through an incision in the flank, opened the reticulum and extracted the offending wire, or needle, as the case



FIG. 3.—The stomach of a calf. The rumen is smaller than the abomasum. ($\frac{1}{2}$ nat. size.)
(Museum, Royal College of Surgeons of England.)

may be. It is gratifying to know that in a fair number of cases such operations have been successful, not merely in finding and removing the foreign body, but in saving the life of an animal.

THE HAT-PIN.

A charming lady, on her thirtieth birthday, received from her devoted husband a hat-pin surmounted by pearl. Later in the day she visited the mansion of her parents, and as haymaking was in progress, full of glee, all took tea in the hayfield. The lady took off her hat, placed it on the grass, and stuck the pin in the ground near the hat. The wind was playful and quietly blew the hat about. When the lady picked up her hat she could not find the pin. Mother, father, sister, servants, haymakers, male and female, joined in the search. They raked the grass and racked their brains until darkness put an end to the search. The birthday, in spite of the brightness of the day, ended in gloom.

The scene shifts to Christmas. The lady who lost her hat-pin spent the holiday with her parents. On the morning of Boxing Day the bailiff reported that the prize cow was ill and the vet. was puzzled to account for the symptoms. Two days later the cow died, and at the *post-mortem* examination the hat-pin was found; it had pierced the wall of the reticulum and entered the pericardium.

The story is clear. The cow, when eating grass, had accidentally swallowed the hat-pin, and in due course it penetrated the stomach and inflicted a fatal injury.

THE BAILIFF.

The bailiff, incidentally mentioned in this case, was a peculiar man, and attracted my attention two years before the cow episode. The mansion of my friend had large capacious chimneys which served as excellent nesting-places for some jackdaws. There was a disadvantage in this, for when winter came the nests interfered with the escape of smoke, and it became necessary to send men on the roof to remove the nests. To avoid this the bailiff had the chimney-tops covered with wire netting. The following spring the enterprising jackdaws, finding the chimneys closed against them, flew to the stables and turned the pigeons out of the dove-

cotes, and there they built nests, laid eggs, and successfully hatched them.

About the time of the cow's death the bailiff's conduct excited comment. When he sent flowers to the mansion they would differ in variety, in colour, or in kind. For example, he would send roses, geraniums, and pansies; anemones, hyacinths and daffodils; tulips red, white and blue. In the same way he would send vegetables and fruit for the table, always three kinds. The animals were sent into the fields in groups of three, or three kinds: cattle, sheep, and pigs; a cow, calf, and pony; an ox, an ass, and a horse. This eccentricity excited comment and amusement. He would send three men to work in a field, or dig the garden; or a man, woman, and a boy. Gradually his master noticed that the fruit trees were being pulled up, so that those left stood in groups of three. It then became a serious matter. Finally, he began to fell the timber so that three trees stood together. In one field the trees would be an alder, ash, and elm; in another, oak, ash, and thorn. In one meadow it was fortunate that he spared an interesting thorn that marked the course of an old road along which Queen Elizabeth rode when she went to the revels at Kenilworth. I have seen that thorn. The cows could ruminate in the shade of the oak, the pony could scratch his rump against the ash, and sheep could leave their wool on the thorn. When the bailiff began to cut down timber trees matters became serious—his sanity was in doubt; then followed a consultation. He was found to be a religious monomaniac. In vulgar language, he was cracked on the Trinity. The poor fellow was incarcerated in a lunatic asylum and died within three months.

Clinical Cases.

BILATERAL PSAMMOMA IN THE HORSE.

By F. H. STAINTON, M.R.C.V.S.

Kensington.

Subject.—Aged bay gelding.

History.—Had worked six days and sometimes seven days a week uninterruptedly for seven years and *never showed a symptom* until the morning in question.



Bilateral Psammoma.

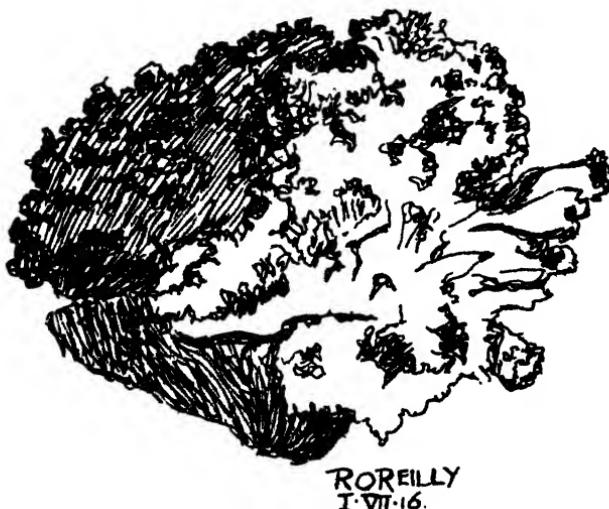
Symptoms.—After coming in from work the animal suddenly started shaking its head violently, climbing into the manger, and behaving much as a horse with "staggers."

When called in I was informed that the horse had gone mad, and I found the animal lying on the ground. Pulse slow and full, and breathing stertorous. Pupil very dilated and reflex absent. Temperature 105° F. Condition alternating between coma and violent struggling with muscular contraction, during which considerable injuries were self-inflicted. Seeing that treatment was useless I destroyed the animal, and a *post-mortem* examination revealed bilateral psammoma as seen at A and B in photograph.

PAPILLOMA IN THE BLADDER OF A MARE.

BY CAPTAIN A. S. LEESE, A.V.C.

A BROWN (rider) mare, trooper, about ten years old, was evacuated to hospital from the Front labelled "For removal of calculus." She showed great irritation of the bladder by frequent severe straining, every effort being accompanied by ejection of a few drops of normal-looking urine.



A portion of the papillomatous growth.

On examination of bladder through the wall of the vagina it felt like a solid organ. By passing a finger down the urethra I plainly felt a firm growth inside the bladder.

Under chloroform I dilated the urethral opening until three fingers were in the bladder, and this revealed that the tumour was of great size and that its attachment was out of reach. I then cut the sphincter muscle in an upward direction in the median line with a bistoury caché and got my whole hand into the bladder, hoping to find a pedicle which could be got at with an écraseur. I found, however, that the tumour had too broad a base. I removed a good deal of the tumour with my fingers and found it to be a papilloma weighing about $\frac{1}{4}$ lb. The mare was destroyed as she was in considerable pain and it was impossible to remove it all. A post-mortem revealed great thickening of the wall of the bladder and that the growth had extended almost all over the interior.

TWO FOAL CASES.

By G. MAYALL, M.R.C.V.S.

Case 1.—PARALYSIS OF THE BLADDER IN A FILLY FOAL.

CALLED to a filly foal on May 5 that was unable to hold her water. Found a fairly well grown subject about a month old, with the lower two-thirds of its tail and its thighs from the vulva to the hocks wet through. Left a bottle of the following medicine: sodae brom. $\frac{1}{2}$ oz., liquid ext. belladonna 2 drachms, glycerine 1 oz., water to 6 oz. A tablespoonful in a wineglassful of water, three times daily. On May 16 when I called, the foal was a little better, but the dribbling of urine had not stopped. Passed the catheter and injected the bladder with a very dilute solution of cresol and left some more medicine as above. On May 18, the condition of the foal was much the same, thighs and tail still wet, and urine passed involuntarily, especially when the foal turned quickly in the box. Passed the catheter and drew away a small quantity of high-coloured urine. Afterwards cauterized the urethral exit with silver nitrate in the stick. On May 23, foal much better; passed catheter and drew away about a pint of urine, lightly cauterized urethral exit and left a bottle of medicine: soda bicarb. 1 oz., fluid ext. belladonna 1 drachm, water to 10 oz. Two tablespoonfuls night and morning in a wineglassful of water. From this time onwards the foal made a recovery and when I docked her a week ago she was quite dry behind and had put on flesh.

It was while reading Whitla's "Dictionary of Treatment" (human subject) that I came across the cauterization of the urethral exit as a treatment for incontinence of the urine in girls. Whitla writes that incontinence of urine is frequent "in the girls and neglected children sent into industrial or charity schools." In this case I attribute recovery to the catheterization and the use of the silver nitrate.

Case 2.—DIARRHŒA IN A FILLY FOAL.

Called to a filly foal about two months old, suffering from diarrhoea. Prescribed chlorodyne $\frac{1}{2}$ oz., bismuth and salol mixture 2 oz., water to 8 oz. Two tablespoonfuls in a wineglassful of water, three times daily. The mare was going out to work every day and the foal suckled on her return. Advised resting the mare for a day or two, and on my next visit, June 5, took some more medicine as above for foal, which I found slightly improved, and also left six powders for mare, containing 6 drachms of soda bicarb. in each powder. I visited the foal on three occasions afterwards, and at one time after the mare had been at work there was some recurrence of the diarrhoea, so I left instructions that some of the milk should be drawn away from the mare before the foal was allowed to suck, that when she was overheated she should be allowed to cool before the foal was put with her, and also, as far as possible, the times at which the foal sucked should be regular. Many small men are obliged to work their mares while they have foals at foot, but this fact does not leave the dam's milk in the best condition for the foal. This foal eventually made a good recovery.

MY FIRST ACTUAL EXPERIENCE WITH FISTULA OF THE EAR.

By J. E. STRAYER.

Hartington, Neb.

ON Sunday, December 18, I received a telephone call to come thirteen miles to see a bad case of distemper (strangles). The wind was blowing a gale, such as we have in Nebraska occasionally; this interfered materially with the telephone service. The meagre message informed me that "A colt has had the distemper two weeks and has a running sore on the ear. Come at once." On arrival I found a two-year-old colt, draught type, with a fistula half-way up the ear,

discharging a thick, dirty whitish substance, somewhat resembling the white of an egg. Immediately below the fistula was an enlargement filled with the grumous substance mentioned above. Pressure on this enlargement caused a discharge at the fistula; and just below this enlargement a solid object could be felt, which projected about $\frac{1}{4}$ in. above the parietal bone. Its outline could be distinctly felt and I had no hesitancy in saying it was a tooth formation.

The parties claimed the colt had this discharge about two weeks, but further inquiry brought out the fact that they had owned the colt two weeks and did not know how long the condition had existed. The original owner was consulted at a later date, which brought out the fact that the colt had an enlargement there when he was two weeks old.

The parties were advised to bring the colt to town, where he could be placed on the operating table. This they did the next day. The field of operation was shaved, disinfected and cocainized as deeply as possible. A horizontal incision was made, the tissues were removed, and this revealed the odontome, which was surrounded by a substance macroscopically resembling alveolar periosteum, which adhered very tenaciously to the tooth and parietal bone. The forceps were applied with hopes of removing the periosteum and tooth *in toto*, but the capsule crumbled under the pressure of the forceps. Several futile attempts at extraction were made and it seemed that the parietal bone was very likely to fracture, but after a long, continued rotary movement I was able to extract the tooth, which was $1\frac{1}{2}$ in. long and $\frac{1}{8}$ in. in diameter at the crown, and gradually tapering to the fangs, which were four in number and about the size of straws. There was just enough space between the fangs so their outlines could be distinctly seen.

The molar had a roughened or carious appearance, with a groove running from one fang around the tooth and communicated with the fistula at one point of the crown. This point was as white as it is possible for ivory to be, which proved conclusively that the object was intended for a pre-molar. The outlines resembled the third upper pre-molar. The crown was directed upward, fangs downward and inclined inward toward the petrosal bone; 40 gr. of bichloride of mercury were placed in the cavity and held in position by some cotton. The colt was sent home the ninth day apparently not feeling worse as a result of the operation and treatment.—*Journal of the American Veterinary Medical Association.*

LUXATION OF THE FLEXOR PEDIS PERFORATUS
TENDON IN THE DOG.

By G. MAYALL, M.R.C.V.S.

CALLED to an Irish terrier dog lame on June 24. Found patient carrying the near hind leg, and a mark as of recent injury just above the point of the hock and the hock capped. Left some opening medicine, and had the leg rubbed twice daily with lin. saponis co. and the dog strictly kept up. On 27th subject a little better, and it was now while examining the leg that I found the tendon slipped off the point of the hock to the outside with a cluck, and that the dog walked a few steps all right and then carried the leg again. The point of the hock was still slightly swelled, and after being rubbed two or three times a day for a week with lin. pot. iodidi cum saponis and some aspirin tabloids internally the dog was considerably better, but still carried the leg at times. He was a rough dog, constantly jumping and chasing after cats and other dogs, and so not a very good patient.

About a year ago I had a fox terrier patient with luxation of the patella that made a good recovery after about a month, and after painting the joint daily with tincture of iodine. These luxations in the dog are very troublesome, and this is the first case I have met with of luxation of the perforatus tendon in any animal, so thought it worth recording.

Translations.

A CASE OF FATAL HÆMOPTYSIS IN A COW WITH THROMBOSIS OF THE PULMONARY ARTERY.

By DR. E. WYSSMANN,
Neuenegg.

ON the evening of June 3, I was called to attend immediately a 5-year-old Simmental cow which discharged large quantities of frothy blood from the mouth and nose a few minutes after drinking and showed great anxiety and difficulty in breathing. When I arrived at the place ten minutes afterwards the cow was already dead. After the death the owner had stuck the cow in the usual way but little blood had flowed away. The mangers and floor of the stall and the surroundings were covered with bloody froth.

In February two years previously, the cow had been attended by me for foreign body indigestion, and in fact according to my notes she was treated for severe febrile gastritis, temperature 103° F. to 105° F., and right-sided pleurisy with greatly increased superficial respiration 40 per minute. After application of a sharp counter-irritant the condition improved slowly, and as a result apparently complete recovery occurred. In the autumn of the following year the cow calved normally, and gave from 1½ to 2 gallons of milk each milking time. During the spring and summer the quantity of milk declined to 12 pints at a milking time, and now and again suddenly sank to 7 or 8 pints. Sometimes the cow showed off and on a weak cough and after drinking laboured breathing.

Post-mortem showed the lungs increased in size threefold, hard to the feel and with very numerous subpleural hæmorrhages, having a spotty appearance. The trachea, bronchi and bronchioles exhibited numerous long rods of clear red, coagulated blood. The smaller arterial branches in the lungs were quite blocked with blood in places. The left lung containing numerous nut-sized purulent masses with partly firm, yellowish, and partly fluid purulent contents (emboli). In the right lung there were small infarctions. There was a necrotic, stinking focus in this lung and in the pulmonary artery a thrombus 15 cm. long and 7 cm. at the base. This thrombus in the direction of the heart possessed a mushroom-like, hollowed out, flat appearance and a very fine stratification could be recognized in it. On the ventral arterial wall it was firmly adherent, laterally

and dorsally it confined an evil-smelling, grey purulent mass which was situated between it and the arterial wall.

The bronchial glands were swollen and contained small foci of pus. There was a large quantity of coagulated blood in the left chamber of the heart. The right chamber was empty.

Wyssmann considers that the origin of the complaint was traumatic gastritis and pleurisy, and then a secondary thrombosis in the pulmonary artery, leading later on to numerous embolic formations. These latter declared themselves clinically by the often noticed decline of milk supply. The thrombus took two and a third years to develop and bring about the fatal haemorrhage, which shows that it grew but slowly. The cause of the haemorrhage was the enormous stoppage in the right lung combined with profuse throwing out of blood into the bronchioles, causing the left branch of the artery to become impervious. Perhaps, also, it was the result of fresh emboli and acute heart weakness therefrom.

Friedberger and Frohner attribute haemorrhage from the lungs in cattle to tuberculosis, disease of the arteries, emboli, and foreign bodies; Hutyra and Marek to tuberculosis and new formations. Rossignol saw a fatal haemorrhage from ulceration of a tumour in the lungs. Vicari saw a case which was a second attack where over three quarters of the lungs were involved. The place from which the haemorrhage came could not, however, be discovered.—*Swiss Journal of Veterinary Medicine.*

ATRESIA OF THE LACTEAL DUCT.

BY DR. STEFFEN.

ATRESIA of the lacteal duct is commonly termed teat stricture. The occlusion is usually a partial one, rarely complete. The seat of stricture or closure may be at the teat orifice, along the course of the duct, or at the proximal end of the duct where it emerges from the sinus lactiferus.

When the stricture is located at the apex, or near the distal end, the milk enters the teat quite readily, but difficulty is experienced in squeezing it out; the stream is very thin, or it squirts in several directions.

When the stricture is farther up, or at the proximal end, difficulty is experienced in getting the milk to fill up the teat: after the teat is filled it is ejected easily.

In rare cases, which may occur in heifers, there is a true atresia or closure of the duct orifice in the end of the teat. There is only a slight pit or depression in the epithelium, at the point where the duct normally emerges, but the epithelium is not perforated.

With two exceptions, strictures of the teat have an unfavourable prognosis. One exception is that form occurring at the very extremity or external orifice of the duct; the other exception is that form appearing as a true atresia in heifers.

In the various forms involving the duct higher up and at its proximal end, the treatment is not very well understood nor accompanied by satisfactory results. Of course, there are cases of the latter variety occasionally which have a satisfactory termination, but they are rare. The treatment which is in vogue for these conditions (and to all appearances as good as we can do) is fraught with danger from the standpoint of sequelæ, of which mastitis is the most important.

The various operations which have been recommended and quite thoroughly tried out, as well as the different types of bistouries and dilators, have not proven of much value in general practice. It is almost an absolute necessity to have hospital facilities for the proper and conscientious performance of the measures required to correct a high stricture in the lacteal duct. It is decidedly humiliating for the veterinarian in general practice to see a severe mastitis succeeding manipulations for the correction of a condition which, to the farmer, seems a trivial matter.

In our practice we refuse to treat a high stricture of the teat until we have clearly explained to the owner what the chances are. We make it clear to him that rarely is any form of interference attended with results which are so satisfactory as to warrant the attempt; that in many instances a severe mastitis, which will probably destroy the quarter, will supervene. If, after this warning, he is still willing to submit the cow to treatment, we attempt dilation, and in some cases incision of the stricture. We have not enough faith in any procedure for the correction of this condition with which we are familiar to give it space here.

In those cases which involve the apex or distal end of the duct we can obtain good results with fair regularity. We have met two forms of the condition in this part of the duct. One

form is a true stricture or narrowing of the lumen of the duct, probably as the result of infectious or other inflammatory processes. In this form we are able to obtain good results from dilation. It is not very important how this dilation is accomplished, so that it is done aseptically and bloodlessly. We use an ordinary teat dilator, repeating the stretching every few days. The best method is to dilate and allow the duct to collapse repeatedly, from six to ten times at each treatment. Insert the dilator, expand it as far as indicated, and then hold it there for one or two minutes; take it out, wait a couple of minutes, and repeat. Do this from six to eight times at each sitting, and in a few days again. Three to five of these courses of stretching accomplish the desired result.

The other form which we can also treat successfully is a narrowing of the orifice of the duct from collections of evaporated mucus or similar concretions. These collect just inside the edge of the orifice, and are of the consistency of dry putty. When an instrument is passed over them, a faint, scraping sound can be detected.

They are to be very gently removed with a small eye curette or an ear spoon, and the parts are then to be given an application of glycerine by means of a cotton swab.

Cases of true atresia of the distal end of the lacteal duct which occur occasionally in heifers can also be treated with very satisfactory results. The duct is perfect except for the appearance of the orifice through the skin.

When the teat has been thoroughly cleansed, the pointed stilet of an exploring trocar is used to puncture the skin. This puncture is made exactly in the centre of the pit, which is always present, and just deep enough so that the point penetrates the skin. With slight pressure, but not enough to cause the stilet to enter deeper, it is turned from right to left, and from left to right a few times. It is then withdrawn and laid aside. A small sharp curette is now used to enlarge the opening until it is of such size that a milk tube will readily pass through it into the duct. A little pressure may at first be necessary to enter the point of the tube in the duct.

A small strip of gauze saturated with glycerine is then forced a short distance into the duct and allowed to remain, with an inch or so protruding. This strip of gauze is removed after twenty-four hours and the heifer milked regularly.

The restraint for this operation is always to be in the recumbent position. If the operation is deftly performed it is practically bloodless.

In heifers this operation should be performed just before or immediately after calving.

We would call the veterinarian's attention again, before closing the discussion, to what has been said about high strictures of the teat. Our experience is that the veterinarian can serve his client best in most of those cases by advising that the condition be left alone, letting that particular quarter go dry.—*American Journ. of Vet. Med.*

FODDER POISONING.

BY VETERINARY-SURGEON J. KUNZ.
Grosswangen (Lucerne).

CALLED to eight cows, during a period of a few weeks, suffering from fodder poisoning. Five of the subjects died very quickly, showing violent convulsions and symptoms of brain irritability. Collective *post-mortem* showed gastritis and inflammation of the spinal marrow as a result of intoxication as a cause of the disease. Pica or licking disease was prevalent in the whole herd. The grounds for this was the feeding of large quantities of clover, among which there was a fair amount of clover fungi, *Polythrincium trifolii* (*Splarna trifolii*, Pers), discernible. Dammann, in his "Text-book of Hygiene," records cases of disease due to clover fungi quite similar to those occurring here. There was sudden onset of staggering or rocking of the hindquarters and paralysis of the loins. *Post-mortem* showed "haemorrhagic gastro-enteritis, sub-endocardial ecchymoses, and hyperæmia of the coverings of the spinal cord."

Specimens of the clover were now sent to the Botanical Institute of the University of Berne, and the presence of clover fungi was confirmed. No detailed investigations were made on the toxicological peculiarities and effects of the fungi, and the Institute merely gave warning "of the presence of the named parasites on the clover leaves without drawing the further conclusion that these fungi were the cause of the cattle being poisoned." From the facts, however, and the comparison with

the symptoms of intoxication described by Dammann, the injurious effect of these fungi cannot be doubted. An interesting fact proving a connection between licking disease and food intoxication seems to me to be proved by the following: On the neighbouring holding *Polythrincium trifolii* occurs in similar abundance, but there was no licking disease, and among these pica-free cattle there were no intoxications.

Some authors, like Dr. Leichti, of the Agricultural Chemical Experimental School at Liebefeld, believe that severe cases of illness and sudden deaths as a result of licking disease are due to infection through the drinking water. Whether the noxious properties of the water have been proved I do not know.

Zschokke describes an infectious paresis due to poisoning by crushed maize, but in several other cases infection through the drinking water was proved, and the cause of the illness was ascribed to a cocco bacterium of the *Bacterium coli commune* family.

Similar symptoms of disease are described in the text-books as a result of pica. A malady affecting the central nervous system arises. Lehmke defines licking disease in cattle as "a chronic disease, declaring itself by disturbance of nutrition brought about by lack of phosphorus, and commencing from primary disease of the central organ and nerves on whose integrity nourishment depends."

In the older text-books a failure of the salts of nutrition, especially sodium salt, is stated to cause pica. Catarrh of the stomach and intestine accompanies pica as a result. A lack of sodium salts in the blood or over-acidity of the stomach may bring about an abnormal irritability of the gastric and intestinal mucosa. When this is present to a high degree we get ulceration of the stomach, and in man the analogous peptic ulceration of the stomach. Gastritis and gastro-intestinal catarrh also occur. All these lesions of the mucosa favour in a high degree the resorption of toxic substances. In the presence of licking disease and its results a predisposing moment comes about in quite a marked way for all kinds of intoxications. The best prophylaxes against fodder poisoning is an energetic dealing with and avoiding of pica. Where this is carried out cases of fodder poisoning are reduced to a minimum. Dry food and corn food should be added to the green food. Calcium phosphate,

sodium bicarbonate, and aromatic bitters are indicated. Calcium phosphate may be given repeatedly in very large doses (500 to 700 grm.) until all symptoms of pica have disappeared. After long-continued wet and rain, sodden green food licking disease is most frequent.

G. M.

CAPTAIN J. J. DUNLOP, A.V.C.

THE brave deed for which Captain Dunlop was awarded the Military Cross happened whilst he was attached to an Artillery Brigade at the time he was in veterinary attendance at the waggon lines of a battery in a village behind the trenches. The road between this village and the next was under direct observation from the German side and was subjected periodically to shelling. The French, indeed, from whom the British had recently taken over the ground, had stopped all traffic by daylight but it was used by the British. On the day in question the road, at a point about 400 yards from the village, was shelled at right range and two men were seen to be hit. Accompanied by an Artillery sergeant, Captain Dunlop ran to the spot, but before getting there a very plucky soldier, riding a motor-bicycle and sidecar, which was passing, stopped and lifted one of the wounded men and safely brought him in. The other man was very badly wounded all over, especially his legs, which were smashed. Captain Dunlop improvised splints and fixed him up as well as possible. Whilst attending him they were accurately shelled, one shell landing only three yards off, but fortunately bursting away. They managed to carry the wounded soldier down to the village, having to take cover several times from shells.

Shortly afterwards a small farm-house in which were billeted some engineers and transport was heavily shelled. Captain Dunlop was informed that casualties had occurred, so went in and brought out one wounded and one dead sapper. He then started off for home, but was overtaken and told that some transport mules were under fire and that some had been hit. He went back and saw them transferred to another place, dressing some and shooting two.

Reviews.

Veterinary Handbook and Visiting List.—By Thomas B. Rogers, D.V.S., Lecturer on Contagious Diseases of Animals in the Medical Department of Temple University, Philadelphia, Pa. Price 6s. net. Published by J. P. Lippincott Company, Philadelphia and London.

This little book of 119 pages is designed to help the veterinarian in prescribing and dispensing. It is after the same style as our Banham, but not so comprehensive and complete. The importance of bacterial therapy, chiefly useful for diagnostic purposes, is accentuated in an opening chapter of eight pages. This is well written, concise, and valuable. A knowledge of the incubative period of contagious and infectious diseases is important, and a list of the hatching time of some of the common ailments is given. Prescription writing is always a bit of a bugbear, because only a very few men gain that knowledge of Latin that is any use to them in after life. Consummate knowledge of a dead language is not as a rule exhibited. However, this handbook will enable prescribers not to make palpable "bloomers," or peculiar innovations, especially if they do not write *quantum sufficiat* as they are advised. The dose table of drugs commonly used is not a very complete one, and we see no reference to the external uses of many of them, and note some striking omissions. The value of hypodermic injections and their uses is not stated even as regards physostigmine, atropine, arecolin, or digitalin. Really subcutaneous injections need more consideration than they get from all writers on therapeutics. A duration of pregnancy table is given in which that of the sow is put at 115 to 120 days. In 40 per cent. of cases the period may be 125 days, at any rate in this country. Complete tables are compiled of the relative value of apothecaries' weight and measure and that of the metric system. There is a whole series of blank pages in the book intended in one case to make notes on the action of drugs and in the other to record visits.

The Harrison Anti-Narcotic Law does not affect us here, but it will be explanatory to state from the chapter on the subject that a very strict record has to be kept by veterinarians of the purchase, use, dispensing, and prescribing of any preparation of opium or coca leaves. The veterinary surgeon who deals in these narcotics must be registered by the authority. The supervision is carried out by the Collector of Internal Revenue, and the Harrison Act is a Revenue Law.

The book is a useful one, and has its good points. It is well worth perusal by those specially interested in drugs and their prescribing, and no doubt some useful wrinkles may be gained from it.

G.M.

Tropical Veterinary Bulletin. Issued under the direction of the Honorary Managing Committee of the Tropical Diseases Bureau, Imperial Institute, S.W. Sold by Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden, W.C. Editor, A. L. Sheather, B.Sc., M.R.C.V.S. Price 3s. net.

Like all journals at present this periodical shows symptoms of curtailment, and as a sign of the times we notice only two annotations from German sources whereas formerly they used to be numerous. There is a moral attached to this statement which is pleasant, and presages the decline of the Hun influence on medical science.

The three references most interesting to us in this country are those on "The Virulence of the Blood of Infected Animals," "Pneumocystis carinii in Mice in England," and "Nambi-uvu, a Disease of Dogs in Brazil."

Regarding the first-mentioned subject, it is stated that the blood of animals infected with foot-and-mouth disease is virulent during the whole of the febrile period, and its virulence is greater than that of the liquid obtained from the lesions. Both serum and corpuscles inoculated separately are capable of producing the disease, and they appear to be of equal virulence. The second reference mentioned refers to protozoal parasites found in the lungs of a wild mouse killed at Cambridge. The author thinks that the encysted parasites leave the host by way of the mucus in the oral or nasal secretions, and passage may take place from host to host by contamination or casually. The dog disease in Brazil is chiefly interesting comparatively to canine pathologists and therapeutists. It is characterized in the acute attack by dullness, pronounced jaundice, and progressive anaemia, which lead to a fatal termination in from three to ten days. A subacute form is denoted by haemorrhage from the skin of the ears, back, or other parts of the body. Chronic cases mostly recover.

This is the second number of Vol. IV of the *Bulletin*, and those interested in tropical medicine cannot afford to do without it. It flits from subject to subject of foreign land ailments. The references are models of conciseness and lucidity. A perusal of its pages shows what a vast field there is in the world for research, and what a horde of diseases inimical to animal life and welfare there is to be checked and subjugated.

We are glad to see that France and Italy are rising to their opportunities, and doing good work in their domains.

The Annual Reports of the Accra Laboratory for 1914 and of the Medical Research Institute, Nigeria, receive due consideration in the *Bulletin*.

G.M.

ARMY VETERINARY SERVICE.**REGULAR FORCES. ARMY VETERINARY CORPS.**

Major F. S. H. Baldrey, retired pay, to be temporary Lieutenant-Colonel while holding appointment of Assistant Director of Veterinary Service.

Appointment to temporary rank of Major of Captain R. W. Mellard is antedated to June 8, 1915.

Captain (C. Mil) to be temporary Captain: A. R. Cameron, Canadian A.V.C.

Temporary Captain L. L. Manchester relinquishes commission on termination of engagement.

Lieutenant to be temporary Captain: C. A. Stevenson, Canadian A.V.C.

To be Lieutenants: G. Frayne, J. J. Bourke.

Lieutenants to be temporary Captains: C. W. Ruttan, M. J. Preston, A. Savage.

Temporary Lieutenants to be temporary Captains: R. L. Lewis, G. S. Arkcoll, W. Anderson, T. G. Heatley, F. W. Cosgrove, J. McK.Brown, C. J. Clibborn, J. H. Taylor, F.R.C.V.S., E. Evans, J. MacFarlane, D. Starkey, F. D. Smith, M. J. Reidy, S. H. Kesten, E. J. Burndred, A. W. Brasnett, S. G. Bright, E. B. Reynolds, B. A. Brown, R. T. Skelton, W. P. Ruthven.

Temporary Lieutenant W. A. Dellagana relinquishes his commission on termination of his engagement.

Temporary Lieutenant L. H. Leach relinquishes his commission on termination of engagement; temporary Lieutenant H. Tweedley relinquishes commission; temporary Lieutenant R. Stokoe relinquishes his commission on termination of engagement.

To be temporary Lieutenants: Farrier-Sergeant W. M. Parsons, 115053 Canadian A.V.C., L. J. Kelly, A. T. Crowther, T. J. Kenny, J. McAfee, W. T. Edwards, T. Dalling, W. R. Kennedy, E. G. Robertson.

Lieutenants to be temporary Captains: Captain J. L. Rich, Lieutenant R. M. Lee, Lieutenant W. A. Robertson, Lieutenant W. E. S. West, all of Canadian A.V.C.

To be temporary Quartermaster with rank of Lieutenant: T. McHugh.

TERRITORIAL FORCES. ARMY VETERINARY CORPS.

Major (temporary Lieutenant-Colonel) W. R. Walker (Major Res. of O.) relinquished his temporary rank on alteration in posting.

The date of the following Lieutenants to be Captains to be August 5, with precedence next above Captain J. H. Thomson, instead of as previously notified: C. A. A. Ewin, G. McIntyre, W. N. Jürgensen, H. McVean, J. Hill, H. E. Powell, J. P. Heyes.

Lieutenants to be Captains: W. R. Williams, J. M. Lund, G. L. Harber.

Temporary Lieutenants to temporary Captains: R. W. Paley, R. Bickerton.

To be Lieutenants: J. Mullany, W. M. Jackson.

CANADIAN A.V.C.

Captain to be temporary Major: E. Edgett, A.D.V.S.

ARMY VETERINARY SERVICE.

Extracts from *London Gazette*,

WAR OFFICE, WHITEHALL.

The following despatch has been received by the Secretary of State for War from Lieutenant-General the Hon. J. C. Smuts, Commander-in-Chief, East African Force:—

General Headquarters, East Africa,
May 8, 1916.

My Lord,—In accordance with the last paragraph of my despatch dated April 30, 1916, I have the honour to bring to notice the names of those whom I recommend for gallant and distinguished service in the field.

Staff.—Temporary Lieutenant-Colonel R. J. Stordy, E. African V.C.; Major W. Jowett, S. African V.C.

Special Reserve.—Lieutenant (temporary Captain) W. W. Henderson, E. African V.C.

WAR OFFICE, WHITEHALL,

July 12.

Mentioned in Despatches.

The following are mentioned for distinguished and gallant services rendered during the period of General Sir Charles Munro's Command of the Mediterranean Force.

Headquarters Staff, &c.

Major J. J. Griffiths, F.R.C.V.S.; Lieutenant-Colonel W. J. Tatam; Colonel E. Taylor; Major E. S. Oliver; Captain C. M. Stewart; Sergeant P. W. Bunn, 320; Lance-Sergeant (temporary Sergeant) F. Skinner, 232; Lance-Corporal (temporary Sergeant) G. R. Osborne, 340; Private (temporary Sergeant) A. W. Baird, 3663.

Captain C. L. O'Gorman, Australian A.V.C.

July 13.

The following is a list of officers and men brought to notice by Major-General C. V. F. Townshend, C.B., D.S.O., in connection with the operations under his command:—

Lieutenant P. J. Kerr, Indian A.V.S. Reserve of Officers; Acting Shoeing Smith R. Rudd, 1881, 21st Lancers; Syce (Acting Driver) Gunga Din, 6.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

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The Late CAPTAIN J. P. HEYES, M.R.C.V.S., A.V.C.

THE
VETERINARY JOURNAL

SEPTEMBER, 1916.

Editorial.

THE MELBOURNE UNIVERSITY APPLICATION.

THE request made to our Council by Professor Harold Woodruff, Dean of the Faculty of Veterinary Science of Melbourne University, that the B.V.Sc. graduates of this University shall be admitted to our "Register" as Colonial Practitioners is one that will no doubt receive due and serious consideration by our governing body. It is a sign of the times that the request is made, and provided that the University authorities can show that their teaching and examining is equal to that prevailing in this country we see no reason why they should not be granted what they ask.

We notice in our "Register" that a blank space for Colonial and Foreign Veterinary Surgeons has existed for some time. The pages are distinguished by their pristine whiteness as if they were analogous to "the white flower of a blameless life." They form a useful gap for making notes in, but do not indicate any violent progress or productive husbandry. Perhaps the day will come when "the desert will blossom as the rose."

In Colonial regions we can imagine that some graduates from extraneous institutions may be more practical and valuable than our home examples. At any rate, a man going from this country will for a time be quite at sea in attending to a kangaroo, buffalo, camel, elephant, gazelle or ostrich, and yet the nature of his early teaching may be sounder and more substantial than that of the colonial collegian. It is rather an anomaly that a British graduate going to act as a veterinary surgeon in America has to sit before an American board before he is given a licence to practice,

but self-preservation is the first law of nature, and no doubt the Americans believe our standard of knowledge is not so high as theirs. If we carry this analogy to our own colonies and possessions it tends to make us put on our considering caps.

We have always assumed human nature being what it is, that examinations for diplomas conducted by teachers of the examinees can never be as valuable as those carried out by efficient external examiners. We know that much has been said and written to the contrary, but it has never convinced us. The difficulty, however, in a comparatively young, undeveloped, and growing colony or continent is that the supply of old crusted examiners is for a long time never likely to be equal to the demand, if external examiners are to be essential. The trouble, however, is not one that it is impossible to get over. Reliable and competent representatives from the mother country may be appointed to hold watching briefs over the examinations, and the representatives asking for the innovation can concentrate on the thoroughness, broadness, and high standard of their teaching.

For the rest we can see nothing but good in the granting of the request of the Melbourne University. The more of the right type of members on our Register to act in places not overcrowded with our fraternity the better and more thorough the advance of our profession will be. The bigger the number of united men the more likely are they to come into their own, and the easier the difficulties that meet them are likely to be overcome. We can even see a valuable advantage in having colonial representatives on our Council.

The ground to be hoed is big, the work to be done is vast, the more the workers can plan and reason together the better for them individually, the greater the uplift, and the finer and more valuable the character of the work. The hour has struck for all sections of British activity to work together for the common good, and it will be our own fault if our body is left behind in the advance. We are intellectual enough to win through, lead, and set an example, and we desire neither to be lacking in foresight nor far sight.

THE COPY AND THE ACTUAL.

THE copy may be so like the actual as to defy detection. The thought and effort in making the former may lead to the acquisition of ability for easily overcoming the difficulties attending the production of the latter. The carrying out of a perfect imitation may effect the grasping of the main principles in the creation of the reality. We often wonder whether the use of models and artificial conditions are taken the fullest advantage of when teaching dexterity and adaptability in the art of surgery and obstetrics. Most men know that the knots in surgical sutures are not well placed if they are tied directly over the wound itself, and the importance of fixing the point of an angular wound before dealing with its edges is also evident, but we do not remember this being impressed on us as pupils, and yet we had worthy and experienced tutors.

Again the operation for the extraction of a horse's molar tooth may very well be learnt in its first principles on a dead subject. The value of getting the mouth wide open, a good light into the buccal cavity, the proper fixing of the forceps on the right tooth to be drawn, the insertion of the fulcrum in the best place, the correct position of the operator and movement of the extractor to loosen and draw the tooth are all lessons learnable in college days. Yet too often knowledge of these things is acquired afterwards. The operation for removal of the lateral cartilages is one that even experienced practitioners are hazy about. Its copy on one dead subject may be done eight times. Smith's operation for side bone, too, ought to occasion no difficulty as regards its technique to the embryo M.R.C.V.S. if he has taken every opportunity to learn his art and science early. Spraying and Cæsarean section can be done a time or two on the dead subject and the material in a College clinique or a decent practice comes to hand now and then.

Perhaps our profession is lacking most in respect to obstetric models. It is true that opportunities for a few calving and foaling cases occur to most pupils, but there are an almost infinite variety of foetal positions that will tax all the skill and ingenuity of the practitioner to overcome. Nearly all of these can be illustrated on a reliable imitation of a pregnant animal.

We have heard of a graduate spending an hour or so in trying to get a rope round the foot of a calf in a breech presentation by carrying the noosed rope into the uterus of a cow and attempting to put the noose over the limb from its pedal end. It never struck him that if he had carried the line round the hock between the hind legs, noosed it outside, and drawn it loosely round the hind leg that he could have slipped it down on to the fetlock or over it, drawn the cord tight, and thus raised the hind leg after pushing the calf forward. Had he practised well on a model the difficulty would probably never have arisen.

To the thoughtful man there are many other things likely to occur in practice, that constitute its profitable side, in which a graduate may well be grounded by paying early attention to imitations before dealing with realities.

Students will doubtless require to request, point out, or agitate before all they require is granted, but to turn out good men is payment of a debt of honour, and an aim worth striving for. A good knowledge of the copy aids materially in dealing with the actual.

SOME NOTES ON THE LIFE OF WILLIAM PERCIVALL.

WILLIAM Percivall, along with Blaine and Youatt, was one of the earliest giants of the veterinary profession, who did much to raise it from an obscure position to one of some standing. His only surviving son, Percival Percivall, an ex West India Regiment officer, now living at Ipswich, aged 72, says that he was born in Kent in 1793, and was the son of John Percivall, Army Veterinary Surgeon. He was a pupil of Professor Sewell, and probably obtained the diploma of the R.V.C. in 1811. He served in the Peninsular campaign and received a medal and two clasps as veterinary surgeon to the old artillery drivers. The artillery drivers as such were disbanded after the battle of Waterloo, and the Royal Horse Artillery formed. In 1820 Percivall was appointed Veterinary Surgeon to the Life Guards, and was alternately stationed at Regent's Park Barracks, Knightsbridge, and Windsor. He had five sons and one daughter. One son, Thomas, entered

the Army as a veterinary surgeon, and was attached to the 11th Hussars for twenty years, but did not continue his father's literary work. Percivall was a keen observer and a faithful recorder. He was a great authority on "Lameness," and many of his remarks on this disability are as true to-day as when they were written. He was on friendly terms with Gamgee, William Field, Senr. and Junr., and Dr. Fleming. He died, working up to the last, at his house at Richmond, in 1854, and was interred in the family vault at Brompton Cemetery. The cause of his death was Bright's disease. His works include "Lectures on the Veterinary Art," published in 1823-1824, a copy of which he gave to the Emperor Alexander of Russia in 1824, and was presented in return with a gold snuff box. His "Hippopathology," in four volumes, was published in 1834; "Anatomy of the Horse" in 1832; and "Form and Action of Horses" in 1850; and in 1853 "Diseases of the Chest and Air Passages of the Horse." In January, 1828, he brought out the first number of "The Veterinarian," and was sole editor, but soon became associated in its production with W. Youatt. After Youatt's death he again took up the reins himself.

He studied at St. Thomas's Hospital, and in 1810 passed the examination for M.R.C.S., and subsequently became a Licentiate of the Apothecaries' Company.

Not much is known of his public professional life except that, as with all prominent men, he was the subject of much jealousy. He only appeared once as a lecturer, delivering a discourse on "Veterinary Science," at the University of London, on November 20, 1833.

[Mr. Percival Percivall, a son of the subject of this biography, Mr. H. L. Roberts, F.R.C.V.S., of Ipswich, and Mr. E. W. Hoare, F.R.C.V.S., of Cork, have given assistance in the compilation of these notes, which we hope will be interesting to the profession.—G.M.]

Selected Article.

LOCAL ANÆSTHESIA*

By PROF. G. H. WOOLDRIDGE, F.R.C.V.S.,

Royal Veterinary College, London.

ANÆSTHESIA, in the broad sense of the term, is "suspension of sensation," whether due to disease or injury or brought about by various agents called anæsthetics for surgical purposes. It is this so-called "surgical anæsthesia" that is to be dealt with in the course of this paper.

The chief objects of anæsthetics in surgery is the abolition of pain during operations, the prevention of various reflex movements, and the production of muscular relaxation. They are thus very valuable agents from the humanitarian aspect, and also from the surgeon's point of view by facilitating diagnosis and treatment.

Anæsthetics may be either *local* or *general*, the former acting only on the part to which they are applied, and the latter acting on the central nervous system and causing complete loss of sensibility. The production of local anæsthesia is thus indicated for surgical operations on limited areas, and also when it is considered dangerous to produce general anæsthesia on account of some defective condition of the patient. General anæsthesia is indicated, or called for, in the more serious or major operations involving larger areas or body cavities, in bad cases of dystokia, to relax muscles in the reduction of herniæ and luxations, and for setting of fractures; and also, in the case of the dog particularly, to cause relaxation of the abdominal muscles to facilitate the examination of the abdominal contents for diagnostic purposes.

The general advantages of anæsthetics both to the patient and the operator are now so well recognised, that in the British Isles, at any rate, their use is becoming more general, and I trust that the day is not far distant when no operation involving pain will be performed without the assistance of some anæsthetic or analgesic, if such can possibly be applied.

LOCAL ANÆSTHESIA.

Local anæsthesia can be brought about by various means. The old methods consisted of compression of nerve trunks and the

*Read at the meeting of the Central Veterinary Society on July 6th.

application of cold. The former was brought about by the use of the tourniquet, an agent now rarely used for that purpose, although still of great service in the practice of haemostasis during operations on the limbs. The application of cold was accomplished by a mixture of equal parts of pounded ice and common salt in a muslin bag, and kept on the part for five or ten minutes until it was practically frozen. This method was superseded by the use of a spray of anhydrous ether or of ethyl chloride to freeze the part by rapid evaporation. These methods are not advocated now, as both the freezing and thawing processes are more or less painful, and if the part is too well frozen the healing process may be considerably retarded.

The local anaesthetics now employed are various chemical agents which produce paralysis of the peripheral endings of the sensitive nerves. They include cocaine, eucaine, holocaine, novocain, stovaine, acoine, tropacocaine, and hydrochloride of urea and quinine, and they may be used singly or in combination, either by painting on to the surface—which I call topical anaesthesia—or by injecting in or round the part to be anaesthetised—infiltration anaesthesia—or by injecting over the trunk of the nerve supplying the part—conduction anaesthesia. Excellent advantage can be taken of this latter method of anaesthetising the foot of the horse both for operations within the hoof, where for obvious reasons the local anaesthetic cannot be directly injected into the tissues, and also for assisting in the diagnosis of the seat of obscure lameness by the process of exclusion. In such cases the anaesthetic may be injected over the plantar nerves above the fetlock joint.

Cocaine, an alkaloid obtained from the leaves of the *Erythroxylum coca*, was the first chemical agent used in the production of effective local anaesthesia. (It was used for its effect on the eye about thirty years ago.) I will consequently consider cocaine first, and treat it later as a standard of comparison for various substitutes that have been introduced since Schleich demonstrated its wonderful utility when infiltrated into the tissues.

The pure alkaloid cocaine is only very sparingly soluble in water, but its salt, the hydrochloride of cocaine, is freely soluble in water and alcohol, and, being equally efficacious, is employed. When a 5 per cent. solution of cocaine (HCl) is applied to a mucous membrane or injected into the cutaneous or subcutaneous tissues, the first noticeable effect is pallor due to vascular contraction occurring in about

45 secs. to one minute; two or three minutes later the part has become insensible to pain and touch owing to paralysis of the sensory nerves of the part. This is due to a direct affinity on the part of cocaine for the cell protoplasm, especially of the sensory nerve-endings. This affinity for protoplasm should be well remembered when deciding upon the strength of the solution to be employed. I have frequently observed that when more concentrated solutions than 5 per cent. are infiltrated into operation areas, the healing of the operation wound is very materially retarded. The affinity of the cocaine in those strong solutions is such that it actually becomes a cell poison, and either markedly reduces the vitality of the cells or even destroys it, and healing by "first intention" is rendered impossible. I therefore, in the light of further experience, prefer to employ for infiltration anaesthesia larger quantities of weaker solution, injected at a series of points round the operation area, rather than a smaller amount of a stronger solution injected directly into the site of operation, a view contrary to one which I expressed several years ago when writing on the same subject. For injection into the tissues 1 per cent. to 4 per cent. solutions are to be preferred to the stronger solutions, though the latter, from 5 per cent. to 10 per cent., may be employed over a nerve trunk to produce conduction anaesthesia of a part below. In such cases the cells of the part directly exposed to the cocaine are not further mutilated by the operation incision, and the ill-effects are not so likely to occur; moreover, the anaesthetisation of the remote parts is more likely to be complete. When injected under the skin the area anaesthetised extends about an inch round the point of the needle. The insensibility occurs in from three to five minutes, and lasts from twenty to thirty minutes.

The amount of cocaine that can be injected with safety and without causing muscular spasms likely to interfere with operation varies with idiosyncrasy of the patient. In the small or so-called toy dogs 1-10th of a grain (*i.e.*, 10 minims of 1 per cent. solution) for each pound body-weight is usually quite safe. In larger dogs the same proportion may be employed, but in any given case 2 gr. (40 minims of 5 per cent. solution of 100 minims 2 per cent. solution) must be regarded as the maximum amount. In the cat the same proportion may be employed, but $\frac{1}{4}$ of a grain must be regarded as the maximum safe dose.

In the horse the maximum dose is 10 gr., an amount which is rarely required. Some horses are more susceptible than others, and I have seen great excitant toxic effects follow the hypodermic injection of 2 dr. of a 5 per cent. solution containing about 6 gr. of cocaine. Two grains in 40 minims of water injected over each plantar nerve will completely anæsthetise a horse's foot. I have no experience in the use of cocaine in cattle, except for the eye in cases of chaff under the eyelids, in which case it is very effective, allowing the foreign body to be removed quite painlessly, and in the operation for carcinoma of the orbit, when it is equally effective.

The local anæsthetic action of cocaine is much improved by combining with it a solution of suprarenal extract of adrenalin, or its synthetic substitutes, suprarenin, adnephrin and renastyptin. These agents cause a contraction of the vessels at and around the seat of injection, rendering the part anæmic and reducing the local circulation. Consequently the absorption of the cocaine into the general system is retarded, and the local anæsthetic action is rendered more complete and more prolonged. Less cocaine is necessary, and the danger of poisoning is thus reduced in both ways. The operation is further facilitated by being almost bloodless. The amount employed is from 5 to 10 minims of 1 : 1,000 solution for dogs, and up to 1 dr. of a similar solution for horses.

When small doses of cocaine are absorbed into the general circulation the effect is to act as a restorative and general stimulant of the central nervous system, and is consequently a very useful agent for producing local anæsthesia and minimising surgical shock in weak animals, especially dogs, when general anæsthesia is regarded as dangerous.

Toxic Effects.—When too large doses of cocaine are injected toxic symptoms are set up. A few minutes after the injection in such cases the patient begins to lick his lips and salivate, the eyes become dilated, and visual accommodation is interfered with, excitement and general hyperæsthesia are produced, the ears are moved rapidly backwards and forwards, and there are well-marked muscular twitchings or clonic spasms, and interference with co-ordination of movement, while horses paw the ground and are often difficult to control. This state of affairs, and particularly the muscular spasms, obviously defeat the object of the administration of the cocaine, and it is impossible to proceed with the operation.

until the symptoms subside, which may be several hours later. In the smaller animals it may prove fatal by paralysing vital nerve centres and causing syncope or asphyxia. If one wanted to be certain of killing a dog by cocaine, however, it would be necessary to inject from 5 to 8 gr., according to size, which would be fatal in about half-an-hour, while from 2 to 3 dr. is necessary to be certain of killing a horse. The best antidotal treatment in susceptible animals appears to be the administration of either morphia or caffeine hypodermically, or a good dose of strong coffee, together with perfect quietness.

Owing to the toxicity of cocaine, a number of very useful synthetic substitutes have been introduced, their chief recommendation being that they can be used with greater safety in the smaller and more susceptible animals. These agents include novocain, B-eucaine hydrochloride, hydrochloride of urea and quinine, stovaine, holocaine 1 per cent., tropacocaine 2 to 3 per cent., acoine 1 : 1000, and others.

I have had considerable experience with each of the three first-named, and I do not recollect having any untoward results from any of them, using them in precisely the same manner as cocaine. They each have certain advantages over cocaine, and, like cocaine, their effect is improved by a combination with a haemostatic.

Novocain is a non-irritant local anaesthetic freely soluble in water, and may be sterilised by boiling. It may be used in similar strengths (2 per cent. to 5 per cent. solutions) as cocaine, and in much larger quantities without the danger of producing toxic effects. I consider novocain to be about the best of the local anaesthetics.

Hydrochloride of B-eucaine is also a very good local anaesthetic. Compared with cocaine it is less toxic, its action is longer in commencing, but also more prolonged. It can also be sterilised by boiling. It is often advantageous to combine cocaine and eucaine in order to obtain the quicker action of the former and the more prolonged action of the latter. When combined the solution should only contain half the percentage of each ingredient.

Hydrochloride of urea and quinine is probably the least toxic of all the local anaesthetics. It is effective in solutions of 1 per cent. to 5 per cent., and can be used on quite young animals with perfect safety, and it is very cheap. It is, however, very slow in bringing about anaesthesia, and requires to be injected

about thirty minutes before operating; while, on the other hand, its effects are very prolonged, extending in many cases even up to twenty-four hours. The advantage of this is, of course, very obvious in many of our patients, as it reduces the tendency of the patient to interfere with the operation wound during, at any rate, the first day. It does not appear to possess any effective haemostatic property, and may be combined with adrenalin with advantage. I have amputated digits in dogs, and excised tumours in dogs and horses in comfort without any indication of pain in nervous animals that have objected strongly to the primary introduction of the hypodermic needle.

Spinal Anæsthesia.—Intraspinal injections of sterilised local anæsthetics introduced in the lumbar region may be used to produce anæsthesia in the posterior part of the body and the hind limbs. Under this anæsthesia quite serious operations in the human subject can be performed painlessly in patients for whom general anæsthesia would be dangerous. Macqueen and Woodruff, in "Veterinary Medicine" (Finlay Dunn), say: "The injection is made through the lumbo-sacral space at the point of intersection of two lines, one median uniting the last lumbar and first sacral vertebræ, the other transverse connecting the summits of the internal angles of the haunch." The entrance of the needle into the subdural space is indicated by the escape of cerebrospinal fluid. I have no experience of this method, and should with difficulty be persuaded to attempt it, since equally advantageous results in the smaller animals may be obtained by other means much less dangerous, such as the application of a local anæsthetic in combination with the administration of a full dose of morphia half-an-hour or an hour previously. The chief objections are the uncertainty of absolute asepsis, the difficulty of injecting the anæsthetic into the proper place, and without injury to the spinal cord, and the serious nature of the complications if they should arise in this particular situation. In the larger animals, moreover, the distance of the spinal canal from the skin renders the injection still more difficult.

The Combination of Morphia with a Local Anæsthetic.

Dogs frequently struggle considerably when put on the operating table simply from fright at the fact of being under restraint. In such cases the use of a local anæsthetic alone does not secure the necessary quietude for successful and easy operation, and the use

of morphia is a very great assistance. The dose injected hypodermically varies from ½ gr. in a puppy of the toy breeds to 2 gr. or even 3 gr. for adults of the large varieties. After such injection the dog usually vomits in from one to five minutes, and sometimes faeces and urine are evacuated. Narcosis is complete in about three-quarters of an hour. The local anaesthetic can then be applied and the operation proceeded with. One great advantage of this method is that the dog remains in a state of stupor for 18 to 24 hours, and so refrains from interfering with the operation wounds. For major operations involving the peritoneal cavity, a few whiffs of chloroform may be necessary, but great care must be taken as the excitant stage is practically non-existent and complete anaesthesia is very rapidly produced with a minimum of chloroform.

Chloral hydrate, administered *per os*, or injected into the peritoneal cavity in dogs, has not given such satisfactory results in my experience.

The use of morphia and of chloral hydrate in the horse have also been disappointing, and I have not persisted with them, mainly because I have always found the horse to be such an excellent subject for chloroform.

THE DEVELOPMENT OF SCLEROSTOMES IN HORSES.

DIAGNOSIS, PROPHYLAXIS AND TREATMENT.

DR. A. ALBRECHT.

SCLEROSTOMES are the most frequent animal parasite of the horse, and they have been the object of many changes in nomenclature. In 1801 Rudolphi described *Strongylus armatus*. In 1831 Mehlis differentiated *Strongylus armatus* from *Strongylus tetracanthus*. In 1897 Pöppel subdivided the former *Strongylus armatus* into two forms: a larger form, *S. armatus* Rud., and a smaller, *S. neglectus*. Stickler (1901) finally divided the earlier *Strongylus armatus* into three forms according to the tooth-like weapons of the mouth capsule.

1. *Sclerostomum quadridentatum*=*Strongylus neglectus*—Pöppel=*Strongylus armatus*—Rud., in part=*Strongylus equinus*—Müller;

2. *Sclerostomum bidentatum*=*Strongylus armatus*—Rud.=*Sclerostomum vulgare*—Loos;

3. *Sclerostomum edentatum*—Loos= *Strongylus armatus*—Rud.

Loos (1909) described many species of *Strongylus tetracanthus* in Egypt under the name "Cyathostomum."

Since the subdivision of sclerostomes into three parts is only recent the forms used in earlier investigations are not known. Our later knowledge shows that studies of infestation of the mesenteric arteries must have been conducted with *Sclerostomum bidentatum*, since this is without exception the form involved in arterial parasitism.

Glage (1906) found that *Sclerostomum edentatum* has a typical development in the subperitoneal tissue, and that it may infest any tissue covered by that membrane. Schlegel is of the opinion that subperitoneal development of this larval form is the chief cause of sclerostomiasis in colts. It frequently causes the formation of parasitic nodules in the lungs and liver that may be confused with the lesions of glanders.

Albrecht found sclerostomes as intestinal parasites in nearly every horse examined and believes this represents the usual condition. Eggs were found in the faeces of 42 army horses out of 44 examined; 18 of the 42 also carried eggs of *Ascaris megaloccephala*. Post-mortem examination of the digestive system usually revealed numerous specimens of *S. bidentatum* and *tetracanthum* less frequently *edentatum* and *quadridentatum*. These were most numerous at the junction of the cæcum and colon.

Material for investigation consisted of eggs and larvæ taken from mature females, and from the faeces. Eggs of *S. tetracanthum* are larger and narrower than those of the other three species, which cannot be differentiated. In faeces they are always found singly, are elongated, have a thick wall, and are coloured yellow by the bile pigment of the intestines.

Development of the egg depends on the amount of oxygen and heat. At ordinary room temperature 2 to 3 days is required for the development of the embryo and separation from its covering. In a few days eggs are no longer found in the faeces, one only finds embryos, which are best termed larvæ. The larvæ are curved, have a long thread-like tail and a conical anterior end. The cuticle of the youngest larvæ is very delicate, but soon increases in thickness. After a time the outer cuticle gradually loosens until the larva is free in the old cuticula, within which it moves freely. This form may be termed the ripe larva. While the

larva in its earlier stages is non-resistant, especially to drying, it now becomes highly resistant and survives in faecal balls that are completely dry on the surface. In a 0.5 per cent. formalin solution they remain active after twenty-four hours.

Distinct variations in the different larvæ are not present until after two to three weeks' growth, but in a warm temperature they may develop in a few days. The larvæ of the *tetracanthum* have a long tail, the anterior end of the body is more pointed, and there is a sharp demarcation between the body and the tail. The intestinal canal is shorter than in *bidentatum*. Larvæ of *bidentatum* are somewhat thicker than *tetracanthum*, the anterior end less pointed, the posterior end gradually passes into the thread-shaped tail which is shorter in proportion to the body. In *S. tetracanthum* the intestinal canal is enclosed in 8 to 9 large cells, in *S. bidentatum* in 32 cells mosaic in form and arranged in double rows.

After moulting the body retains its length, but the tail is lost; it is now known as the rhabditis form (rod-shaped) and has a short posterior end.

In Albrecht's investigations the larvæ remained in their sheaths for 8 to 9 months when kept in faeces or water. When they are placed in a moist oven at 35 deg. C. for several days many are separated from the sheath. According to Baillet this process of moulting occurs in 15 to 20 days, but the observations of Albrecht indicate that this first moulting process does not usually occur in the outer world, but after entering the host. After moulting the dried larvæ possess great vitality and were observed to retain life for five months in ordinary water without special nourishment.

Sclerostomes in fresh faeces were confined to eggs in a state of division; they were never found just before or immediately following the first moult. In the intestinal contents of slaughtered horses larvæ were found in only one case, but many sexually mature individuals were found, especially at the junction of the cæcum and colon. The larvæ may be found in faecal matter three days old, and in contaminated straw. When one places a faecal ball that is at least three days old in a glass dish, pours over it a physiological salt solution of pure filtered water so that the bottom is covered with a few millimetres of liquid, the larvæ soon wander to the water and with good light may be seen with the unaided eye. They have

the appearance of small worms, move actively, and through the entanglement of their tails may form distinct balls.

It is probable that the larvæ are taken through the digestive tract. Segmented or embryonic eggs ingested with food or water are not capable of further development. The process of wandering from faecal balls to water occurs in pastures, where under proper moisture conditions the larvæ become attached to grass. Animals at pasture are more subject to infestation than when hitched in stables, though the habit of nibbling dirty straw in stables is a common method of ingestion.

As in all parasitic diseases the gravity and nature of the disease and the intensity of the symptoms are in direct proportion to the number of invaders. A few sclerostomes seem to cause no symptoms. *S. bidentatum* and *S. tetracanthum* are largely infestations of young horses. Larvæ that cause aneurisms in the anterior mesenteric artery cause lesions that remain during life. In addition to causing embolisms, larvæ that wander as individuals into the terminal vessels of the intestines give the first impetus to intestinal diseases (colic). Under ordinary development the ingested larvæ, without intermediate carriers, develop directly through several moultings into sexually mature individuals in the intestines. In other cases larvæ leave the intestines via the blood stream and are carried to the greatest variety of body organs where they should be regarded as strayed individuals. It is highly improbable that the development of the sexually mature *S. bidentatum* depends on the passage of the larvæ through the mesenteric arteries.

It is very important to find means to prevent the ingestion of larvæ with the food and thus prevent the migration of the parasites to the intestinal arteries of the horse. Diagnosis is highly important in providing for prophylaxis, and it is very easy to determine the presence of sexually mature parasites in the intestinal canal through finding the eggs in the faeces. With a pincette remove from a fresh ball a piece about the size of a pea. Place it on a slide and separate it with a few drops of clean water. After bringing to a thin film examine with a 100 to 150 magnification. Short forms of eggs indicate the three large species, while long oval eggs characterize *S. tetracanthum*. The following method of diagnosis may also be used: Place a ball of the suspected faeces in a clean vessel and protect against drying, let it remain 8 to 14 days, pour over it clean water until it is completely saturated and a

small amount of water remains in the bottom of the dish. After a few hours pour off the water and examine it for larvæ. In warm weather the larvæ are usually present in 5 to 8 days, or the process may be hastened by keeping the faecal ball in a warm, moist place.

After larvæ reach the arteries and tissues they are not accessible, so that their suppression in the intestines assumes great importance. All infested animals should be kept from pastures until free from parasites. Carefully remove all faeces from the stables, and prevent faecal contamination of food and water, though water is not the most frequent carrier of the larvæ. In all intestinal diseases of the horse more attention should be paid to an examination for parasites and eggs. As a vermisuge Albrecht considers turpentine with linseed oil more effective than tartar emetic, which has little or no effect on intestinal sclerostomes. Horses given maximum doses of tartar emetic may still carry eggs of sclerostomes in their faeces. The administration of 80 c.c. of oil of turpentine in 500 c.c. linseed oil has been followed by the expulsion of numberless ascaridæ and many sclerostomes. Since the colour of the sclerostomes so closely resembles that of faeces one must examine the latter very carefully for expelled individuals. Sclerostomes are best destroyed by burning, since thousands of larvæ may develop within a dead female.—D.H.U., *Cornell Veterinarian*.

Clinical Cases.

PARACENTESIS ABDOMINIS.

BY P. G. BOND, M.R.C.V.S.

Plymouth.

I HAVE had two cases of colic lately, which cause me to conclude that the above operation is not resorted to as often as it should be.

In one instance I was called to attend a mare about 18 hours after the attack commenced. Up to this time she had been drenched by the farrier, a man who has acted as such for 40 years. It was then too late to save her; she died within half an hour of my visit. The case appeared hopeless from the start.

Post-mortem examination showed twist of the large intestine, (the colon). In the other case, also a mare, she was found very ill about 8 a.m., and had been so apparently all night. Brought to the Infirmary about 10 a.m. Too late to treat effectively; she died at 4 p.m. Post-mortem examination showed a double twist of the large colon.

In my opinion, had both patients been tapped in an early stage the chances were they would have recovered. All kinds of drenches had been given the first mare, none to the second.

I will try and explain why I think tapping should be done oftener than it is. It must be done in a fairly early stage of the attack.

No. 1, 30 years since, occurred in 1886. Subject a cart mare, the property of a miller. Mare 11 years old. She had an acute attack of colic, and became very much distended at the flanks.

I saw her first about 9.30 p.m., and gave the usual colic drinks. At 10.30 she became worse, and although I had never seen it done, I decided to perform the puncturing operation, which I did. The mare was easy at once.

After I had introduced the cannula I was at a loss as to how long it should remain in. Being undecided, I waited, with the result that I fell asleep in the stable and slept until about 4.30 a.m. The mare appeared easy and comfortable when I awoke. I let

the cannula remain in until 8 a.m. She recovered without any ill effect except that a slight attack of laminitis followed. She got over this, was bred from, and continued to do good work, was then lost sight of.

No. 2 was that of a hunter, aged 5 years, the property of a dealer.

The attack was so bad that I persuaded the owner it was a case of "kill or cure." He consented, and I tapped the colon. Relief was instant. The animal quickly recovered.

This was the first time the dealer had ever seen it done, although he commenced business in 1860, and he had assisted his father previously, who was in business in 1845. The owner had never heard of it from his father.

No. 3, subject a farm horse, aged 9 years old.

Operation thought advisable, was carried out. Animal recovered but an abscess succeeded the puncture. It got to the size of a cocoa-nut. Became ripe, was opened and dressed. It gave no further trouble.

No. 4. That of a tram mare, aged 17 years. At the time of operation was frequently subject to colic. Operated upon in one bad attack about three years since. She recovered, is working now and has only had two slight attacks since, the illness in which we thought to have lost her being quite forgotten by owner.

No. 5. A cart mare, a heavy vanner, aged 12 years. Subject to colic. Was operated upon three years since. Recovered, put to work, and continued without any trouble until last week. She had then an attack and soon died. Showed on post-mortem examination a double twist of the intestine, the large colon.

This is one of the two mares named at first.

I examined the colon to see if any cicatrix remained from the first operation, but found nothing definite.

The trocar and cannula used, Arnold's, fig. 857 in their catalogue. My colic box is not complete without the instrument.

The region selected to operate on is fixed by drawing an imaginary line from the pin bone to the flank. A hand's breadth in front of this is the place to puncture, or where the swelling is highest, put the trocar inwards and downwards.

The portion of the intestine pierced is the pelvic flexure of the large colon on the off side.

The cannula can be secured by a piece of tape if necessary and tied round the abdomen.

It is rarely any after trouble ensues and the operation produces a good result. Is quick and safe.

The old treatment of drenching with opiates is not always successful. A very useful colic draught I give in conjunction with the tapping is as follows:—

Tinct. Aconite, Flemings'	...	10 minims
Sp. Vini Rect.	...	1 ounce
Chloroform	.	20 minims
Sachar Ust. q.s. at pleasure		

Aqua ad ... 10 ounces

This can be repeated in an hour. Two doses usually suffice.

I only send this to give our younger practitioners the assurance that, of my own experience, with ordinary care they will not regret resorting to this beneficial operation.

COITAL OR VESICULAR EXANTHEMA IN THE HORSE.

BY R. C. G. HANCOCK, B.Sc., M.R.C.V.S.

THE note on Vesicular Exanthema in the July number of the VETERINARY JOURNAL is interesting, as it corroborates an experience of my own when a student.

A miller called at the surgery, saying one of his mares that had been served three days previously by a local stallion had got "clap." I saw the case, and found that the vaginal mucous membrane had three or four well-marked raised ulcers, flat-topped, and about the size of a sixpence. Their surface was bright red. The ulcers had the appearance of having been stuck on artificially. There was another ulcer on the hairless skin of the vulva, and one on the buttock, where the penis of the stallion could have easily come in contact during copulation.

There was a yellowish discharge from the vagina. I ordered a weak irrigation twice daily with lysol, and salines in the drinking water.

I returned to college next day, but heard later that the mare was all right in ten days, so that from the date of service about a fortnight elapsed.

It is more probable that spontaneous recovery had occurred, as the affection seems quite benign and heals with or without treatment in about a fortnight.

A CASE OF PRIMARY INFECTIOUS OSTEOMYELITIS IN THE HORSE.

By Prof. SCHWENDIMANN, of Bern.

THERE can no longer be any doubt as to the occurrence of this disease in animals. Different observers (Frohner, Karnbach, Chenot, etc.) have conclusively proved it. Experimentally, Lexer and Rodet have proved it by causing acute osteomyelitis in rabbits by the intravenous injection of *Staphylococcus pyogenes aureus*.

According to Schuchardt hæmatogenous ostitis occurs chiefly in young, growing persons at the most vigorous bone growth (8 to 17 years old). It is often the result of trauma. Acute central osteomyelitis may also occur in animals, a swelling develops, pus forms, presses through the Haversian canals, and an abscess appears superficially in the periosteum.

In a number of cases infection begins in the periosteum, spreads to the Haversian canals, and invades the whole medullary cavity. As portions of the periosteum become loose and the marrow infiltrated more or less extensively, necrosis sets in.

The organism concerned is chiefly *Staphylococcus pyogenes aureus*. Trauma plays a great rôle in the production of the malady, not only in the form of chills, over exertion, but also by direct bruising, and concussion through a fall or a blow.

In animals, in addition to the previously-named disease, a cryptogenetic infectious inflammation of the bone marrow occurs, which is similar to the human maladies.

Staphylococci and *streptococci*, as well as *strangles bacilli*, which gain access to the bone marrow by the hæmatogenous route, bring about the affection.

Whilst the source of the ailment cannot always be proved, the development of bacteria is always brought about by a trauma (contusion or concussion). In horses only the phalanges have hitherto suffered. In this case a sudden high degree of lameness occurs, a hard swelling and thickening of the bone arises. After about a week circumscribed fluctuation, abscess and fistula formation result.

Prognosis is bad.

The following case of primary infectious osteomyelitis and ostitis of the pedal bone occurred in my practice.

A battery horse 14 years old, developed sudden acute lameness on September 8th, and was evacuated to the military hospital at Bern. There was increased pulsation of the arteries at the fetlock, increased warmth of the foot, severe pain on palpation and percussion. These symptoms bore no relation to the degree of lameness. Moderate, but not specially painful, swelling in the region of the toe at the coronet. Rigid examination of the cleansed and freshly trimmed whole ground surface of the foot showed not a trace of injury or deeper strain. The skin round the foot was quite intact, and there was no trace of injury or purulent process.

On the eighth day the animal seemed in great pain, so antiseptic poulticing, undertaken from the first, was discontinued. There was a circumscribed swelling of the coronet at the toe, on the solar surface of the foot near the white line there was a painful zone. A funnel-shaped opening was made and some greyish-yellow thick pus was evacuated. There was no improvement, and the horse was slaughtered on October 8th.

Post-mortem revealed a total recent fracture of the pedal bone. The break line went through the middle of the external wall, sole and joint surface. A necrotic destruction of bone was visible, and a roundish nut-sized sequestrum was removed.

There was no trace of callus formation. The hoof joint showed only trifling inflammation and the cartilages of the joint, apart from the fracture, were uninjured. The pus contained, besides putrefactive bacteria, different kinds of cocci.

The great destruction of bone, together with the relative intactness of the pedal joint, established the conclusion that the fracture occurred late in the course of the disease, perhaps at the moment of unloading at the slaughter house, whilst the origin of the malady was a primary infectious ostitis and osteomyelitis of the pedal bone. The absence of any injury or breach in the horny covering of the foot pointed to cryptogenetic infection.—*Swiss Journal of Veterinary Medicine.*

A PECULIAR SKIN DISEASE OF CATTLE IN N.W. RHODESIA.

By J. MALCOLM ARMFIELD, G.V.O.,
Lusatra, N. Rhodesia.

WITHIN the last two or three years a new and very troublesome skin disease has manifested itself amongst the cattle of this territory. It has accounted for serious mortality in European owned herds, but strangely enough in my particular district I have never observed it in cattle owned by natives. Nevertheless, other district veterinary officers have reported native stock badly affected. Calves under one year old are not attacked.

Very frequently the disease first manifests itself between the hind legs and on the udder; another favourite position is on the thin skin beneath the elbows. But it is also found on the muzzle, along the spine, on the tail, and enveloping the entire limbs—indeed, in advanced cases I have seen animals with literally not a hand space of skin unattacked.

A characteristic lesion is as follows:—Small villous-like growths, about the size of large peas, protrude from the skin; these growths have a roughened surface, and are grey in colour, sometimes not unlike small warts. If one of these is pulled off, a small hollow is left in the skin. Pruritus does not seem to be present.

Cause.—Research work in the laboratory has so far failed to find any specific causal agent.

Many consider the bont tick (*Amblyomma hebraicum*), or a smaller variety of tick to be responsible.

One certainly frequently notices the disease between the fore limbs, between the hind limbs, and on the udder, co-existent with bont ticks. But if the disease is merely caused by the irritation of the ticks, how is it that lesions appear by the spine and on the nozzle, places where bont ticks are rarely found?

It is possible that an organism or a toxin enters the blood stream as the result of a tick bite, and the disease is thus spread to these distant positions.

I have noticed what certainly appeared to be identical lesions, just above the hocks of milch cows, where the limbs had been tied together for milking.

Contagion.— We have never been able to experimentally transmit the disease from one animal to another. We have tried rubbing diseased skin scrapings, taken from a sick beast, into the coat of a sound animal. Also binding scrapings on to an unaffected animal by means of bandages. But the result in both cases was negative.

But, nevertheless, some have declared that the disease gradually spreads from one animal to another. My experience has not been like this. I have seen a very bad animal herded with clean cattle for several months, without spreading the trouble.

Treatment.—At the experimental camp all sorts of external applications were tried, and at length the following conclusions were arrived at:—Bad cases are incurable; medium cases can be cured, or, at any rate, much improved by the application of calcium sulphuret solution prepared as follows:—

Quick lime	1 lb.
Sulphur	1 lb.
Water	1 gallon.

Simmer the mixture over a slow fire for three hours, and apply when warm. Leave on for three days, wash off, and apply again if necessary.

Combined with frequent dipping in an arsenical bath, this was found to be the more satisfactory line of treatment. Several owners of large herds declare that the disease cannot appear in cattle regularly dipped, but I have recently spoken to a trustworthy man, who affirms that he has experienced the reverse condition amongst his animals.

Conclusion.—Unfortunately, shortage of men, owing to the war, is preventing further research work upon this alarming malady, and other equally important ailments in this country.

But the losses resulting from this disease have scared many farmers into building dips, so that it is to be hoped that an improvement in the general condition of the stock will be noticed.

For undoubtedly more than half the trouble amongst the cattle in the country is caused by ticks.

I believe the animal mortality from poverty caused by loss of

blood from sucking ticks alone is very considerable. And on top of this we have to consider the numerous specific infections transmitted by ticks.

It is quite possible that poverty may play some part in the causation of this troublesome skin affection.

HYDROCELE IN A YEARLING BULL.

By R. S. HEER,

Platteville, Wis.

ONE of the most interesting cases that came to my attention during the past year was that of a pure-bred Guernsey bull owned by Charles Wilkins. First inspection revealed a very large hydrocele of the left scrotal sac, the scrotum extending below the hocks. After making a careful examination, I concluded that aspiration of the fluid would be the proper procedure, so I disinfected the skin of the scrotum and introduced a horse trocar and cannula. A large quantity of bloody fluid was withdrawn. Following the aspiration, I injected a 25 per cent. solution of fluid extract of thuja.

Ten days later I was called again and found the scrotum as large as ever, but a great deal harder. I again introduced a trocar, but this time the contents of the scrotum were so thick and flaky that only a small amount came away through the cannula. I then made an incision large enough to admit one finger, and found the entire left scrotal sac lined with a tough membrane about an inch in thickness. A large quantity of a thick flaky fluid resembling the contents of a neglected hygroma of the withers was present. I enlarged the scrotal incision, so that it would admit my hand, and then proceeded to remove the mass of tissue, which seemed to be of a fibrous nature. After all of the diseased tissue had been removed, the scrotum was flushed with Lugol's solution, then packed with sterile gauze, which was left in for twenty-four hours.

The subsequent treatment consisted of a daily flushing with a 1:2000 bichloride solution. In four weeks the scrotal wound was healed. At the end of that time the scrotum had regained its normal size and shape.

Eight months later the Wilkins herd was tuberculin tested, and this bull reacted to the test. I am inclined to believe that the hydrocele was due to tuberculosis of the testicle, or its appendages.
—*Wisconsin V.M.A.*

THE IMPROVEMENT OF LIVE STOCK IN ENGLAND AND WALES.*

THE first Report (Cd. 8017) on the operation of the Live Stock Scheme, which was published in July, 1915, contained the regulations governing the award of grants, with so full an explanation of the objects of the scheme that it is unnecessary to repeat these in detail. It will suffice to say that the grants, which are made out of funds provided by the Development Commission, are of the following amounts:—

Heavy Horse Societies—A grant not exceeding £80 (£40 direct and £40 for assisted nominations) in respect of each stallion subsidised.

Bull Societies—A grant of £15 in respect of each bull if provided by a society, and of £12 if provided by an individual.

Boar Societies—A grant of £3 in respect of each boar.

Milk Recording Societies—A grant equal to half the expenses of the society, but not exceeding £50 per 20 herds.

The chief aim of the scheme is to educate breeders to the value of using good sound pedigree bulls, stallions, and boars, instead of the nondescript and unsound sires whose chief qualification has often been the low fees at which their services could be obtained. Financial assistance is also given to dairy farmers to encourage them to keep records of the milk yields of their cows. The scheme is thoroughly practical, as well as educational, as, under it, sires of merit are provided for the use of farmers at low fees by means of grants paid to the owners of the sires. Incidentally, the advantages of co-operation are demonstrated, as the benefits of the scheme are confined almost entirely to farmers who join boar, bull, heavy horse, and milk-recording societies.

For purposes of administration, the country has been divided into twelve provinces, and in each of these a live stock officer has been appointed. He is attached to a selected agricultural college or institution in the province, and is responsible for the promotion

*This article constitutes the report on the Administration of the Grant for the Improvement of Live Stock in England and Wales for the year April 1, 1915, to March 31, 1916. For the sake of public economy the usual annual Reports are not at present being issued.

of the scheme in his area. Owing to the fact that these officers are men with much practical knowledge and experience of the breeding of live stock their advice and assistance in the selection, purchase, and care of stock is sought, and increasingly so, by farmers and breeders. In some provinces there was an unavoidable delay in the appointment of live stock officers, and it was explained in last year's Report that there were on this account some districts where the scheme had hardly begun to operate. During the year now under review a fair trial has been given to it, and, as far as can be ascertained at present, the scheme has been favourably received on the whole, is working satisfactorily, and if continued for a long enough period of years it promises to have a very beneficial effect on the live stock of the country, especially on that bred by the small farmer and small holder.

In most provinces some counties are more eager than others to avail themselves of the grants. In the backward counties, where the live stock is in greatest need of improvement, it is usual to find the greatest difficulty in getting the scheme taken up, and if grants had not been reserved for such districts more rapid progress could have been shown in the more progressive counties. Particulars of the grants authorised for each province and of the number of animals actually subsidised are given in the Appendix.

It should be remembered that the scheme is only in its infancy. No sires were provided under it till February, 1914, and, except for the first seven months of its existence, it has had to contend with war conditions. Many of the young and most progressive farmers and farmers' sons have joined the Army; labour has been scarce on most farms; feeding-stuffs for stock have been dear to buy, and at times difficult to obtain, and, with the increase in the price of meat, the price of bulls has gone up. In spite of these drawbacks every branch of the scheme has made considerable and steady progress, and the number of sires provided in 1915-16, shows a considerable increase on that of 1914-15, as will be seen from the comparative table.

The progress made in little more than two years is encouraging. Many years must, however, elapse before the object of the scheme is likely to be secured, as farmers will not be convinced, except by practical results, that it is a paying proposition and commercially

sound to use high-class sires whose service fees are double, or even five times as much as those that they have been in the habit of paying in the past. When farmers, who are members of bull, boar, or heavy horse societies, find that their young stock mature earlier and grow into more money than those got by nondescript sires, then, and not till then, will the benefits of the scheme be fully realised and valued.

The assistance given to live stock officers by members of the provincial and county live stock committees has been of considerable service in the promotion of the scheme, and the thanks of the Board are due to them, and especially to the chairmen of the county committees, for their active co-operation and help.

Year. (1st April- 31st Mar.)	Boars.		Bulls			Horses			Milk Recording.	
	No. of Societies	No. of Boars	No. of Societies	No. of Individual Owners	No. of Bulls	No. of Societies	No. of Stallions.	No. of Societies	No. of Cows.	
1914-15 .	100	107	285	26	170	65	72	16	7,331	
1915-16 ...	140	193	459	28	633	88	97	20	9,811	

Grants for Bulls — No part of the live stock scheme has been more keenly taken up and appreciated than the bull section. The number of applications for grants has considerably exceeded in some provinces the number of grants available, and therefore the opportunity has been taken to exercise careful discrimination in the selection of societies and sires. There has been also a gradual weeding out of sires which were not considered to be up to standard. In some cases, too, societies which were somewhat hurriedly formed when the scheme first came into operation have not proved altogether satisfactory, and these have been reconstituted on a sound basis, or the grants have been transferred from them to more promising societies.

The number of bulls located at the close of the year 1915-16 was 633, of which 605 were provided by 489 societies, and the remainder by 28 individual owners. Of these bulls, 461 were located in England, and 172 in Wales. The number of bulls actually purchased and owned by societies was 73, the other 532 being hired by societies from bull owners.

The number of bulls located in each province varied considerably, but this is to be expected as in some counties—such as Cumberland

and Westmorland—the supply of good bulls is large and there is little need of Government assistance.

The popularity of the Shorthorn is evidenced by the fact that of the 633 bulls subsidised, 425 are of that breed. The other breeds are Hereford (70), Lincoln Red (47), Welsh Black (35), Devon (34), South Devon (15), Aberdeen Angus (5), one Jersey and one Guernsey.

The Shorthorn also showed the highest average price with £41. Lincoln Reds and Herefords averaged approximately £40, Devons £39, and Welsh Blacks £28. The average price of all the subsidised bulls was approximately £40.

The service fees of these bulls varied from 2s. 6d. to 7s. 6d. At the former figure, 267 bulls were serving; a charge of 3s. was made in respect of 100 bulls, and one of 5s. for 134 bulls.

It is too early yet to estimate the general effect of the provision of good bulls, but evidence is available that the value of the calves sired by the subsidised animals is usually higher than that of calves got by non-pedigree bulls, and little difficulty is apparently experienced by members of bull societies in disposing of their calves for rearing, and the demand for the heifer calves is much greater than the supply.

Numerous instances have been reported of farmers who are buying a few pedigree cows now that good sires are available to serve them, and at a recent sale of a well-known pedigree herd of shorthorns, 16 animals (2 bulls, 11 cows, and 3 calves) were purchased by members of subsidised societies who, in the opinion of the live stock officer in the district, would have been unlikely to attend the sale if the live stock scheme had not been in existence.

Other indirect and beneficial results of the operation of the scheme may be noted. In some districts where bull societies exist, farmers, who have been for years in the habit of keeping indifferent sires, are now buying good pedigree ones, as they do not like to keep bulls which are inferior to those which their smaller neighbours are now using.

Breeders of pedigree cattle are beginning to realise that the live stock scheme is creating an additional home market for pedigree stock, and they may be relied on to cater for it. In this

connection it is interesting to note the following extract from an article in Volume 6 of the Welsh Black Cattle Herd Book, which was recently issued: "It is significant that there should be such a large number of entries for the present Volume of the Herd Book, which appears at a time when there is likely to be a demand for well-bred bulls for the purposes of the live stock scheme of the Board of Agriculture and Fisheries. It is scarcely too much to say that there never has been anything so far in the history of Welsh Black Cattle that has done more than the live stock scheme has done to bring home to the ordinary breeder the necessity for systematic effort in breeding if the breed is to have a future."

It is evident, therefore, that the bull scheme, though it has been in operation little over two years, is having direct and indirect beneficial effects which must in the course of time tend to improve the cattle-breeding industry of the country.

Grants for Boars — There were 193 boars subsidised in 1915-16, being an increase of 86 on the number located in the previous year. The progress in this section of the live stock scheme for the year under review is not altogether unsatisfactory when the difficulties of forming societies are taken into account and allowance is made for the war conditions that prevail. In some provinces there is apparently little demand for good boars, and great difficulty is experienced in persuading small pig-breeders to form societies to take advantage of the offer of the £3 grants for the provision of boars. In two or three provinces, however, this part of the scheme is fully appreciated, and the grants are much sought after and taken up.

Of the 193 boars located, 91 were Large Whites, 43 Large Blacks, 18 Gloucestershire Old Spots, 15 Berkshires, 14 Middle Whites, 10 of the Lincoln Curly Coated Breed, and 2 Large White Ulster, and the average price was £7 12s. 6d per pig.

The service fees varied from 5s. down to 1s.; the most popular fee was 2s. 6d.

The insistence of the Board in refusing to make grants in respect of non-pedigree boars has resulted in the establishment of herd books for two well-known breeds of pigs, the "Gloucestershire Old Spots," and "The Cumberland," which are to be found chiefly

in the counties from which they take their names, and in counties adjoining them. The value of pigs of these breeds will be enhanced when entered in herd books, and the demand for them is likely to be increased.

Grants to Heavy Horse Societies.—Satisfactory progress has been made with this part of the live stock scheme—the number of societies operating in 1915 being 88 with 97 stallions, as compared with 65 societies and 72 stallions in 1914—and 62 of the 88 societies have been formed since the scheme was initiated in 1914.

A heavy horse society covers, as a rule, a comparatively large area, and includes in its membership many of the leading and larger agriculturists of the district, and the success of these societies and the example of prominent farmers have doubtless encouraged the smaller farmers to join local bull and boar societies.

The number of mares served by the 97 subsidised stallions was 9,122, an average of 94 mares per horse. Assisted nominations, that is to say, payments not exceeding half the normal service fee, were made by the Board in respect of 2,430 of these mares which belonged to farmers whose holdings did not exceed 100 acres.

The average hiring fee paid for these stallions was £24*s.*, and the average service fee approximately £2 10*s.*

In Cumberland and Westmorland somewhat different procedure has been followed from that adopted in the rest of the country. The live stock committees in these two counties made representations to the effect that the number of good, sound stallions travelling in their districts was sufficient, and that the funds authorised should be utilised solely in the award of assisted nominations for the service of mares belonging to small farmers of 100 acres or under. The Board approved of the proposal, and a society was formed whose operations covered the two counties. Committees were appointed to inspect and select stallions for the service of mares. The service fees of these stallions varied from two to three guineas, the average fee working out at £2 7*s.* Assisted nominations,—*i.e.*, half service fees—were paid in respect of 385 mares which were served by 52 selected stallions, and, thanks to the energy and activity of the members of the selection committees

and of the secretary of the society, the arrangements were well carried out, and should prove of considerable benefit to small farmers, as they were enabled to secure the use of better horses than they had been previously accustomed to do.

The approval of sires is left to the selection committees of the societies, and in some few instances it is open to question whether full value is obtained for the hiring fees paid. There is, however, no doubt whatever that the majority of the members of these societies are getting better value for the money expended by them in service fees than they did previously, when they made their own selection of stallions, which, as a rule, depended more on the amount of the service fee than on soundness, pedigree, and conformation.

The scheme has already done much to educate mare-owners to the advantage of combining in order to secure a stallion that is certified sound, is well bred, and of good make and shape. The provision of subsidised stallions, and the scheme under which stallions are registered as sound by the Board are reducing the number of unsound tramp stallions, and, in course of time, should drive them off the road. Farmers are realising more than they did formerly the advantages of using sound sires, and they now hesitate to use a stallion unless certified sound.

However many rosettes a stallion may win in the show-ring, the qualification that most concerns the mare-owner is that of foal-getting, and it is on this most important point that the Board endeavour to obtain information in regard to the stallions recommended for grants. Considerable difficulty, however, has been experienced in getting accurate foal returns, and though the secretaries of the societies take active steps to secure the particulars desired in regard to subsidised sires they often fail to do so because mare-owners will not take the trouble to reply to the enquiries made. Mare-owners often fail to realise their responsibility in the matter, and appear to forget that the information is being collected for their benefit, as no grant is made in favour of a stallion—however good a show-horse he may be—if his foaling record over a period of two consecutive years is a bad one. Payment by results, the system which to a great

extent is followed in Scotland and the North of England, has much to commend it, and the adoption of it in England is well worthy of consideration by horse societies in making their agreements with stallion owners.

Milk Recording Societies.—The milk-recording section of the scheme cannot make much headway under present conditions. Even in normal circumstances farmers are generally loth to embark upon a scheme which is new to them, and of which the financial benefits are not at once apparent. Farm labour is scarce, and, as pointed out in the Report for last year, many of those most likely to be interested in the scheme, and to make it a success, joined the army in the early stages of the war. Satisfactory recorders are increasingly difficult to secure, and in some cases societies have been badly served in this respect, and, in consequence, have not met with very encouraging success. It is satisfactory, however, to record that notwithstanding these difficulties the number of societies has shown a slight increase during the year, and that all the societies that were in existence at the beginning of the year covered by this Report are still "carrying on." In the case of those societies who have had good recorders the results of the year's working have been generally satisfactory, and there is every reason to hope that when conditions are less abnormal the results of this important part of the live stock scheme will fully justify the efforts which are being made to secure its adoption.

The ultimate success of the scheme must depend on the commercial advantage to be obtained from it, and it is satisfactory to be able to report that a member of a milk-recording society, who disposed of his herd last November, estimated that the possession of the milk-record certificates for his cows, which had been issued by the Board, and which were handed round at the sale, had the direct result of increasing the prices made by quite £200 over what would have been paid for his cows if they had not been sold with the Board's certificates.

Several other cases have been brought to the Board's notice of the commercial value of a milk-record certificate. Bull calves, out of cows with good *certified* records have made from £5 to £10 more than their ordinary value. An offer of 50 guineas

each for two in-calf non-pedigree cows, whose records were 800 and 900 gal., respectively, was recently refused by a member of a milk-recording society. Another society reports: "There has been a splendid sale of bull and heifer calves from milk-record cows; forty enquiries for calves were received as the result of an advertisement in an agricultural paper."

The number of certificates issued during the year was 637, and the demand for them came, as was to be expected, chiefly from the most progressive of the societies. A large number of the certificates issued were in respect of cows with milk records of over 700 gal., and one cow, whose records were taken daily, gave 1,774 gal. in the year. There is no doubt the demand for certificates will increase considerably when their commercial value becomes more widely known and appreciated.

Several milk-recording societies have started registers of calves out of recorded cows. These calves are tattooed in their ears when a few days old with permanent identification marks, and particulars of their breeding and of the milk yields of their dams are recorded in the register. By this means a purchaser of these calves either when young or full-grown, is able to form some idea of their suitability for a dairy herd, instead of judging, as is now usually the case, merely by inspection, which by itself affords an unreliable guide in the selection of young stock for dairy purposes.

The number of milk-recording societies in operation at the end of the year now under review was 20, as compared with 16 in the previous year. There were 350 members, and they owned 398 herds numbering, approximately, 9,800 cows. The increase in the number of societies, members, and herds, is not large, but in these abnormal times even a slight increase suggests a not unfavourable outlook for the formation of milk-recording societies after the war.

The accounts of these societies, which have completed a year of operations, show that the average cost to a member is less than 2s. per cow recorded, exclusive of the initial cost of purchase of weighing balances and other equipment of a permanent nature which may be regarded as capital expenditure.

When the financial value of a milk-recording certificate is realised and appreciated an annual outlay of 2s. per cow should be considered a really good investment, and will, in time, no doubt

be regarded as such, and tend to a steady development of milk-recording under this section of the live stock scheme.

The following are the principal memoranda and forms used in connection with the live stock operations of the Board, and copies of them can be obtained free of charge on application to the Secretary, Board of Agriculture and Fisheries, Whitehall Place, London, S.W.—

L¹. Memorandum on the Live Stock Scheme.

L². Regulations as to Bull Grants.

L³. Regulations as to Heavy Horse Grants.

L⁴ and L⁷⁹. Regulations and memorandum as to Milk Record Grants.

L¹¹. Regulations as to Boar Grants

APPENDIX.

LIST OF GRANTS WHICH WERE AUTHORISED, AND THE NUMBER OF SIRES AND MILK RECORDING SOCIETIES WHICH WERE SUBSIDISED IN THE YEAR FROM APRIL 1, 1915, TO MARCH 31, 1916

Province.	Boars.		Bulls		Horses.		Milk Recording		Total Authorised for Province.
	Amount Authorised	Sires Subsidised	Amount Authorised	Sires Subsidised	Amount Authorised	Sires Subsidised	Amount Authorised	Societies Subsidised	
1. Armstrong College .	£ 40	4	£ 305	14	£ 826	* 5	£ 250	?	£ 1,421
2. Manchester University	48	2	1,398	45	480	1	500	1	2,426
3. Leeds University ...	80	15	1,094	71	870	12	400	nil	2,444
4. Harper Adams College	60	14	1,107	46	480	10	400	nil	2,047
5. Midland College ..	64	16	1,080	6*	720	6	400	4	2,264
6. Cambridge University	212	7	1,218	36	1,760	10	450	4	3,640
7. South-Eastern College	56	10	678	21	400	4	250	1	1,384
8. Reading College	188	23	918	41	740	9	400	2	2,246
9. Bristol University ...	118	45	1,495	90	1,033	14	600	5	2,246
10. Seale-Hayne College	60	7	1,058	19	560	5	400	nil	2,078
England	926	143	10,351	461	7,869	76	4,050	19	23,196
11. Aberystwyth College	108	31	1,575	101	960	12	484	1	3,127
12. Bangor College ...	80	19	1,125	71	720	9	352	nil	2,277
Wales	188	50	2,700	172	1,680	21	836	1	5,404
England and Wales	1,114	193	13,051	633	9,549	97	4,886	20	28,600

*Exclusive of the Cumberland and Westmorland Society.

DEATH OF CAPTAIN J. P. HEYES.

THE war has robbed the profession of one of its most capable members in the person of Capt. J. P. Heyes, whose death is announced in a letter from Mr. T. G. Millington, brother-in-law to the deceased officer, saying that Mrs. Millington received a telegram from the War Office of her brother's demise in Malta. Capt. Heyes some time before the outbreak of hostilities accepted a commission in the East Lancashire Divisional Veterinary Service, and when the Manchester Brigade was mobilised in August, 1914, he went out with it to Egypt, and thence to Gallipoli, during which journey he had a remarkable experience in that the Fleet suffered a serious loss whilst the vessel by which he was travelling was in the vicinity. In the course of his services in this theatre of war, Capt. Heyes had great responsibilities placed upon his shoulders, and we have it on the authority of soldiers who have returned that no one worked harder than did the deceased gentleman in furtherance of the success of our arms. Some time ago Capt. Heyes had an attack of dysentery, and following that he was knocked from his horse by a motor transport and was badly injured, with the result that he was sent to Florence to recuperate. He improved and returned to Malta to pursue his work, and there fell a victim to sunstroke, which proved fatal on the 5th July.

In civil life Capt. Heyes was a veterinary surgeon, with premises in Upper Dickenson Street, Wigan. His ancestors had claimed this town as their home for a very long time, and Capt. Heyes' father was a shoeing smith. At twelve years of age he left school and assisted his father in his business, and at the age of sixteen had made such progress that he successfully competed at agricultural shows in various parts of the country against the leading shoeing smiths of the day. He acquiesced in his father's wish to become a veterinary surgeon, and at 19 years of age he proceeded to the Royal Veterinary College, where he quickly came to the front, so much so, that he qualified for and was offered the position of hospital surgeon to the college. This appointment he accepted, and about two years later he returned to Wigan and set up practice. Since then he had made much headway and built up a lucrative practice, which he sacrificed when he became a soldier.

In 1905 Capt. Heyes contested St. Andrew Ward for a seat in the Town Council, but was unsuccessful, though in the following November he secured the verdict by a large majority. Since that time he continuously represented the biggest ward in the borough, and his death, therefore, removes a highly esteemed member from municipal circles. He was a member of the Conservative party, but for his independence of spirit and his straightforwardness he was held in great regard by all his colleagues of the Town Council, by whom his death is lamented.

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The Late COLONEL E. H. HAZELTON.

THE
VETERINARY JOURNAL

OCTOBER, 1916.

Editorial.

POETRY AND THE HORSE.

At a time of conflict like this, when our very existence as a nation is threatened, there may appear to the casual observer little use for the idealism of the poet. Yet poetry has flourished much during periods of strife, and new poets have arisen out of the sound of the guns and the clash of arms—Byron, Shelley, Shakespeare, Moore, Tennyson, Kipling, all knew the value of instilling inspiration and enthusiasm into the warriors by appropriate verses.* Poems of cheer and brave songs of hope have already emanated from men in the trenches. The truth is that poetry is almost a vital necessity in time of war, for the spirit of man soars above the actions of his body, and he craves and hungers for the call of the still small voice. The maker of laws bows before the maker of songs when the multitude goes into action. The "Marseillaise," "Rule Britannia," the songs in the American War of Independence tell us of the value of singing lips when allied to energetic bodies.

The man associated intimately with horses has always been supposed to be rather shaky from a moral point of view, but the poet has frequently seen the romance and inspiration to be gathered from a life that has not been characterized entirely by dull respectability, or serene inaction: "Turpin had his black mare and she carried him well as Fame with her loud breathing trumpet can tell."

The practice of chivalry originated with the horse, and away down the ages we can note how man and his four-footed friend have been constantly favoured by the Muses. The value of the horse in warfare was recognised before the writing of the immortal lines:—

“A horse! a horse! my kingdom for a horse!”

Scott knew the importance of equestrianism when he wrote:—

“‘ Charge, Chester, charge! On, Stanley, on! ’
Were the last words of Marmion.”

The troopers who recently lost their horses felt that they had given up some of the charm of life when they made a mock tombstone of horseshoes and indicated that a regiment's hopes lay buried there. For on foot, how can one realise fully the spirit that “Out of brave horsemanship arise the first sparks of growing resolution, that raise the mind to noble action”? The tending, care and treatment of horses have been carried by the Allies to a high pitch in the present struggle, and when a better time comes for the use of our cavalry we have no fear as to the good account it will furnish. Here and there a trooper will call to mind familiar lines associated with men and horses. He will be buoyed up by a well-remembered stanza or couplet and go gaily into action. Such a warrior will have his day and exemplify in all its grandeur the picture of the equestrian who “grew into his seat, and to such wondrous doing brought his horse as he had been incorpored and demi-natured with the brave beast.”

Perhaps no poet has shown greater depth of feeling for a faithful steed than Adam Lindsay Gordon, the Australian Poet, who out of 56 poems that he wrote devoted no fewer than 13 to the horse. What more appropriate can be written than his tribute in the following lines to the passing of an old friend?

“ All is over! This is death,
And I stand to watch thee die,
Brave old horse with bated breath,
Hardly drawn through tight-clenched teeth,
Lip indented deep, but eye only dull and dry.

“ Rest, old friend, thy day though rife
With its toil hath ended soon;
We have had our share of strife,

Tumblers in the mask of life,
In the pantomime of noon
Clown and pantaloon."

Again, how the spirit of the warrior breathes and throbs in the following lines:—

" Not a bullet told upon 'Britomarte'—
 Suddenly snorting, she launched along—
So the osprey dives where the seagulls dart,
 So the falcon swoops where the kestrels throng;
And full in my front one pistol flashed,
 And right in my path their sergeant got,
How our jack-boots jarred, how our stirrups clashed,
 While the mare like a meteor past him shot;
But I clove his skull with a backstroke clean
 For the glory of God and of Gwendoline."

It is a good thing this alliance of human sentiment with the life of the horse, this seeking to interpret some of his instinct and understanding.

Many brave beasts will go down when the time comes, but we shall be all the better men for thinking kindly of them.

" Baker's horse and grocer's horse and gentle carriage pair,
Hunting horse and farmer's horse, they muster in the square;
A saddle on the withers and a label on the neck—
Off to join the troopers' train and cross the transport deck.
Comrade of your toil or whim—black or brown or gray,
Take a last long look at him and let him trot away!
Shining shod on every foot, tonsured tail and mane,
Here's a horse will never step the Border roads again."

G.M.

DREAMERS.

Is there any reason for dreamers in the ranks of a scientific profession? Dreamers have always been considered unpractical men, living in the clouds, and seldom descending to mundane thoughts and affairs. The practical man has had a halo put round his head by men who do not see below the surface of things. He has unduly been set up as a paragon of professional virtue to copy and follow. Busy in carrying out the thoughts and aspirations of men who have inquired, idealised and constructed—bigger beings than he will ever be—he passes through life doing

profitable work that never rises above a certain level, and never travels beyond certain circumscribed and well-defined limits. The expert has his weak side. He is bound down to efficiency in a well-cultivated area, his horizon is never far off, and he neither tries to peer into another land full of interest and profit, nor seeks to carry his mind and spirit towards the elucidation of a better way.

In the art and science of war, the Germans have studied in a narrow cast-iron groove. They have been slaves to the producing of machines for men, and to the making of men into machines. Their lack of the spiritual dreaming faculty has caused them never to understand the art of colonisation, nor to comprehend the point of view of the natives of a country they have tried to annex. There is something to be said in favour of the freshness which the amateur brings to bear on the professional view of things. A once well-organised and well-equipped nation in martial matters is getting stale now, and the freshness and force of the previous amateurs is carrying them on to the smashing up of the army of experts with its exact and square armaments and defences. Broad views, visualisation, and idealism are finding the weak spots in the armour of the machine-like self-contained and self-centred Bully. Instead of playing the enemy's game, we are profitably adding some play of our own to the regular rules, and the extra play has been possible through the carrying out of the dreams of dreamers. Science is always moving on, but unless its vision is broad it never advances as far as it is capable of doing.

In medical science the dreamers have brought about the greatest progress. It is true that they dreamed and then worked on the ideas originated by their dreams. They were not always and at all times dreamers, but they possessed the faculty of dreaming.

Pasteur, Metchnikoff, Lister, Simpson, Dalton, Newton, Roscoe, Schmidt (the Dane), Dunlop, and a few others were dreamers in their special spheres. They got out of the common rut and the ordinary groove, and became the "architects of greatness," and produced the things that live on. There is room in our profession for some profitable dreaming, and no doubt in future years we shall turn a less favourable eye on the much-belauded practical man, and welcome and bless a dreamer here and there. The dreamers "dare uncharted seas, for they are the makers of the charts."

G.M.

Selected Article.

SAFEGUARDING NATURE'S MOST VALUABLE FOOD—MILK.

Prepared for the New York Milk Committee

By CHARLES E. NORTH, M.D.

THE FOOD VALUE OF MILK.

THE estimate of the food value of milk must be based not only on the several substances which it contains, such as sugar, fat, casein, albumin, and salt, but on its digestibility and its peculiar usefulness in feeding the young. The price paid for cow's milk is very small compared with the price paid for other animal products having equal food value.

ONE QUART OF MILK IS EQUAL IN VALUE TO:

$\frac{3}{4}$ lb. lean beef	...	...	...	at 20c	—15c
8 eggs	...	...	...	,, 36c doz.	—24c
3 lbs. fresh codfish	...	...	,,	12c	—36c
2 lbs. chicken	...	...	,,	20c	—40c
1 pt. oysters	...	...	,,	20c	—20c
4/5 lb. loin of pork	...	...	,,	15c	—12c
3/5 lb. ham	...	...	,,	20c	—12c

AVERAGE—22c

It can be seen from the above tabulation that when the consumer pays eight or nine cents for a quart of milk he is getting an amount of food for which he would have to pay an average price of twenty-two cents if his money were spent on beef, chicken, oysters, eggs or pork. Milk at eight or nine cents a quart is, therefore, a real bargain.

THE MILK INDUSTRY.

Among the products of the soil corn comes first, then beef, then milk. Agriculture depends for the best use of its roughage and for soil fertility on the dairy cow more than on anything else. Dairying is often said to be "the backbone" of agriculture.

Every day the people of the United States use thirty million quarts of milk, as milk and cream, in addition to condensed milk, butter and cheese. Four million dairy cows are milked each

day to produce this. New York City alone uses two million quarts of milk daily, from forty thousand dairy farms scattered throughout seven states. This milk is gathered at twelve hundred shipping stations and comes to the city on eleven different railroads.

The milk industry is one of the giant industries. It is close to the pocketbook of practically every farmer and close to the health of every consumer.

CLEAN MILK.

Decency distinguishes humans from animals.

Decency adds pleasure and appetite to food.

Cleanliness contributes most to decency.

Milk may be safe because it is boiled, but may be indecent because it is filthy.

A little calf can run into any cow stable and take its dinner from a cow and run out again with certified milk in its little stomach. Nature has protected the calf against dirty barns and other sources of milk contamination by a method of milk delivery that prevents such contaminations from occurring. The dairy farmer can imitate the calf by using a milking pail with a small mouth which prevents dust and dirt in the barn from dropping into the milk during milking time.

A clean dairyman can produce clean milk anywhere. A small-mouthed pail to keep out dirt; plenty of boiling water to keep pails and cans sterile; a tank of ice water to keep milk cold; these three things alone will produce wonderfully clean milk on any dairy farm. Where there is no ice, milk can be delivered twice daily to a station where ice is available.

One grain of stable dirt has been found to contain 32,875,000 bacteria. Bacteria are tiny plants. Dirty milk contains millions of them. Clean milk contains only a few hundreds or a few thousands. The millions of bacteria in dirty milk inflame the intestines of children.

Clean milk should not be dumped into the same tank with dirty milk. The clean dairy farmer should receive more money for his product than the dirty dairy farmer. Milk dealers in several cities have already established clean milk stations in the country where payment to the producer is based on the cleanliness of the milk. In addition to the regular market price of the

stations, premiums are paid not only for butter-fat but for milk containing small numbers of bacteria.

Clean milk is winning its fight and dirty milk is losing ground every day.

Clean people buy clean milk.

CLARIFICATION.

Definition.—Clarification means centrifugally cleansing milk of the udder waste, foreign and impure matter it may contain, without affecting its butter-fat or other normal constituents.

At the present time most market milk is dirty, being contaminated with foreign matters consisting of particles of dust, dirt, hay, cow-feed, cow-bedding, cow-manure, hairs, dandruff, insects, etc., etc. Some of these float on the surface, others settle to the bottom as sediment.

The dairy cow herself contributes a peculiar form of contamination. The udder is constructed like a sponge. There is a constant shedding of waste tissue from the lining of the udder. This udder waste often includes the products of udder inflammation. Such inflammations are so common they are present in some form in practically every dairy herd. Even when there is no external evidence there is often internal inflammation discharging its products with the milk.

Udder waste and blood, pus and bacteria from udder inflammations are fortunately heavier than milk. Most of the foreign dirt is also heavier than milk. Consequently when milk is passed through a clarifier these things are all thrown out by the proper application of centrifugal force so that they remain in the machine as a slimy mass which is called "clarifier slime." The amount of such slime removed from milk is about one pound to every six thousand quarts (which would equal for New York City's milk supply 333 pounds daily or over one ton per week). An inspection of the dark and blood-streaked slimy mass instantly convinces the observer that market milk is rendered much more sanitary by its removal.

Clarification adds to the safety of raw milk because along with blood, pus and waste tissue it removes large numbers of the bacteria which cause udder inflammation. Such bacteria may inflame the throats of adults or the intestines of infants.

Clarification adds to the decency of all milk, raw or pasteurized, because it cleanses milk of all gross impurities.

PASTEURIZATION.

Definition.—Pasteurization consists in heating milk to such a temperature for such a length of time as will destroy the most bacteria with the least damage to the milk itself.

Temperature.—The substances composing milk are damaged at temperatures higher than those temperatures at which disease bacteria found in milk are killed. The space between, called the "neutral zone," permits selections of a number of good temperatures and periods for pasteurizing milk without affecting its food value, but with a guarantee that the bacteria of disease will be destroyed. In practice 145 deg. F. for 30 minutes has been agreed upon as best by most authorities.

WHY MILK SHOULD BE PASTEURIZED.

A. *Raw Milk Causes Infant Deaths.*

Twenty-five per cent. of all deaths are of children under five years of age.

More children die from intestinal disease than from other causes. Children's food is chiefly milk.

Dirt bacteria, harmless to adults, irritate and inflame the intestines of children.

Pasteurization kills 99 per cent of the bacteria in milk.

B. *Raw Milk Causes Septic Sore Throat.*

Septic sore throat is a violent form of tonsilitis.

It is often followed by acute articular rheumatism, erysipelas, peritonitis, endocarditis and other serious inflammations.

Boston, Mass.	1,043	cases from one raw milk supply.
Boston, Mass.	227	" " " "
Chicago, Ill.	10,000	" " " "
Baltimore, Md.	602	" " " "
Cortland-Homer, N.Y.	669	" " " "

The disease attacks adults chiefly. There are often deaths.

Bacteria in sore udders of cows closely resemble bacteria found in these sore throats.

Pasteurization kills the bacteria producing septic sore throat.

C. *Raw Milk Causes Typhoid Fever.*

Trask has collected records of 317 outbreaks of typhoid traced to raw milk. Here are a few:—

Glasgow, Scotland	500 cases from one raw milk supply.
Cologne, Germany	270 " " " " "
Port Jervis, N.Y.	59 " " " " "
Springfield, Mass.	182 " " " " "
Oakland, Cal.	262 " " " " "
Montclair, N.J.	107 " " " " "
Stamford, Conn.	307 " " " " "

Pasteurization entirely destroys the germs of typhoid.

D. Raw Milk Causes Tuberculosis.

One hundred and ninety-one tuberculous cows were taken out of the most celebrated certified dairy herd of 632 animals in November, 1914. In December, 72 tuberculous cows were found in a herd of 86 in a model dairy where every expense and precaution had been taken.

Tuberculosis is very common and the majority of dairy herds contain tuberculous cows.

Authorities estimate that 75 to 90 per cent. of human beings have tuberculosis at some time during their lives. Most of this is human, but some of it is bovine.

Tabulation by Park and Krumweide of 1,038 cases of tuberculosis showed the following:—

	CASES	BOVINE	PER CENT.
Adults over 16 years	686	9	1 3%
Children 5 to 10 years	132	33	25 %
Children under 5 years	220	59	27 %
Total	1038	101	10 %

Pasteurization kills the bacteria causing tuberculosis.

E. Raw Milk Causes Scarlet Fever and Diphtheria.

One hundred and twenty-five epidemics of scarlet fever due to milk have been collected by Trask. A few examples are as follows:—

Scarlet Fever.

Buffalo, N.Y.	57 cases from one raw milk supply.
Washington, D.C.	33 " " " " "
London, Eng.	284 " " " " "
Beverly, Mass.	6 " " " " "
Liverpool, Eng.	59 " " " " "
Mt. Vernon, N.Y.	45 " " " " "
Boston, Mass.	195 " " " " "

Diphtheria.

Fifty-one epidemics collected by Trask. A few to illustrate:

Brookline, Mass.	12 cases from one raw milk supply.
Los Angeles, Cal.	35 "
Wellsville, N.Y.	84 "
Clifton, Ohio	36 "
Hyde Park, Mass.	69 "
Warwick, R.I.	64 "

Pasteurization entirely destroys the infections of scarlet fever and diphtheria.

NO EPIDEMIC OF DISEASE HAS EVER BEEN TRACED TO PASTEURIZED MILK.

OLD OBJECTIONS TO PASTEURISATION.

Substitute for Cleanliness.—This is only true if the public and the Health Officers allow it. Such abuse of pasteurization can be entirely controlled by testing the raw milk before it is pasteurized. All milk should first be decently clean. Grades and Standards and Regulations enforced by the Health Officer can do this.

Affects Digestibility and Food Value.—Experimental evidence is hard to obtain. Fortunately New York City has for the past three years carried out a gigantic experiment in infant feeding at its fifty-five municipal milk depots where babies are fed the year round to the number of 18,000 daily in summer and 16,000 daily in winter. For three years all of this milk has been pasteurized. Records have shown that the babies have gained weight, have kept well, have shown no signs of rickets or scurvy and in every way give evidence that pasteurized milk is not inferior in food value or digestibility to raw milk. The death rate among infants during this period has been reduced from 125 per thousand births to 94 per thousand births, which places New York City in the lead of any large city of the world in the reduction of infant mortality.

PASTEURISATION BY THE MILK DEALER.

Pasteurization is performed on a large scale by milk dealers through the use of several types of machinery which not only quickly heat the milk to the proper temperature, but which hold it in a heated condition for half an hour before it is run over

coolers which quickly reduce the temperature to 40 deg. Fahrenheit or lower. Attempts are now being made to pasteurize milk in the bottle and several kinds of machinery have been invented for this purpose, some of which have already been put into successful operation. Pasteurization in the bottle is the ideal method.

Pasteurization at Home.

Where pasteurized milk cannot be purchased or where for other reasons it is desirable to pasteurize milk at home, the process can be easily performed without special apparatus by gradually heating milk to 145 degrees and holding it there for one-half hour, after which it must be covered and kept cold. It is necessary to use a thermometer to be sure the milk is properly heated. Glass bottles of milk can be placed in cold water in a kettle and the water gradually heated to the right temperature. The thermometer should, of course, be placed in the milk bottle, but the temperature of the water should also be tested until the milk reaches the right temperature. A double boiler, sometimes called a rice boiler, is another way by which milk can easily be pasteurized at home.

There are also several very good types of home pasteurizers on the market which are comparatively cheap and easy to operate. The pasteurization of milk at home gives a guarantee to any householder that no disease can enter the family through the milk supply.

Certified Milk.

Certified milk is ideal in the matter of cleanliness and decency and leads all other milks in these respects. In most cases it is produced under precautions identical with those carried out in surgical operations. In the matter of cleanliness certified milk has taught the milk industry a great lesson and has been chiefly valuable because of its influence in improving sanitary conditions in the entire industry.

In the matter of safety certified milk cannot furnish a guarantee. Not only has bovine tuberculosis been constantly found present in the dairy cows of certified herds to some extent, but occasionally it has been found to a very large extent. It has been even more difficult to keep dairy cows free from udder disease. Sore udders are dangerous to the milk consumer as the cause of septic sore throat. Scarlet fever, diphtheria and

typhoid fever have broken out among dairy employees and have been traced to certified milk or dairies operated under similar clean conditions. The result is that public confidence in any raw milk, no matter how clean, has been shaken, and the leading milk authorities now believe that even the best raw milk is unsafe and should be pasteurized.

In the matter of cost certified milk is too expensive. The cost of operation of certified dairy farms is excessive compared with the small number of quarts of milk produced. Every quart carries a heavy tax of from five to ten cents above the normal price. It has been repeatedly demonstrated that at the same expense for sanitary supervision and under more business-like conditions thousands of quarts of milk can be produced clean and decent enough to conform to all demands at only an increase of one cent per quart in price. Much milk is now on the market at ten and eleven cents per quart which is practically as clean and decent as certified milk.

WHICH MILK SHALL I BUY?

In selecting milk for home use from the variety of milks on the market there are three matters of chief importance to be considered. These are safety, decency, and price. In the table below are mentioned several kinds of milk sold in New York City and ordinary raw milk. The character of each is set down in the three respects mentioned, using the number of bacteria as indication of decency.

Table I.
KINDS OF MILK FOR SALE.

MILK	SAFETY	DECENCY (BACTERIA IN RAW PRODUCT)	PRICE
Certified	Medical Veterinary } Sanitary } Inspection	10,000	15-25c
Grade A	Pasteurized in bottles	200,000	10c
Grade A	Pasteurized in bulk, and bottled	200,000	10c
Grade B	Pasteurized in bottles	1,000,000	9c
Grade B	Pasteurized in bulk, and bottled	1,000,000	9c
Grade C	Pasteurized in bulk, and canned	Over 1,000,000	7c
Ordinary Raw Milk	Occasional Inspection	No standard	8c

Safety comes first and is more important than decency or price. If perfect milk scores 100 points, it would be fair to

allow 50 for safety and 25 each for decency and price. There are different degrees of safety and decency. The different prices also affect usefulness of milk, for low prices mean wide use, while high prices restrict usefulness. These degrees of safety, decency and price can be tabulated as follows:—

Table II.

Table III.

Table IV.

POINTS FOR SAFETY	POINTS FOR DECENCY	POINTS FOR PRICE
PERFECT.....	PERFECT.....	PERFECT.....
BACTERIA IN RAW PRODUCT		
Pasteurized in bottles.....	10,000 . . . 25	9c or less.25
Pasteurized in bulk, and bottled.....	100,000 . . . 20	10c. 20
Medical	200,000 . . . 19	11c. 15
Veterinary } Inspection 30	500,000 . . . 16	12c. 10
Sanitary	1,000,000 . . . 5	13c. 5
Scoring farms	Over 1,000,000. . . 0	20c. 0
No Inspection		

If now we put down opposite the milks in Table I. the number of points allowed for safety, decency and price in Tables II., III. and IV., we get the following :—

Table V.

VALUE OF DIFFERENT MILKS.

MILK	SAFETY SCORE	DECENCY SCORE	PRICE SCORE	TOTAL SCORE
<i>Grade A.</i>				
Pasteurized in bottles.....	50	10	20	89
Pasteurized in bulk, and bottled....	45	10	20	84
<i>Grade B.</i>				
Pasteurized in bottles.....	50	5	25	80
Pasteurized in bulk, and bottled.	45	5	25	75
<i>Grade C.</i>				
Pasteurized in bulk, and canned...	45	0	25	70
Certified (raw)	30	25	5	60
Ordinary Raw Milk.	0	0	25	25

From the table it appears that Grade A pasteurized milk scores 89 points and has the highest public value of all milks. This is because its safety is guaranteed by pasteurization, it is decently clean, and can be sold at a moderate price. In short, for ten cents per quart it is possible to get a milk that is decently clean and thoroughly safe. Ten cents makes it possible to pay the dairy farmer a premium for cleanliness. It also pays the

dealer for extra care in handling and in pasteurization. The cost of cleanliness and safety is only one cent added to the regular market price.

MUNICIPAL MILK CONTROL.

No city to-day feels itself safe unless it possesses a pure water supply. Water is a public question. Where water is impure, public opinion demands that the municipal authorities take steps to remedy the evil. In like manner the milk supply is a public question and should be controlled by public authorities. The danger to the health of citizens from milk is greater in many respects than the danger from water. In taking control of the milk supply of a city or town, ideal conditions cannot be established at once, but complete control must be approached step by step as follows:—

1. *Milk Laboratory.*—First step is installation at expense of only a few hundred dollars (\$300-\$500) for apparatus of milk laboratory to test milk for bacteria. Such tests can be made by a young man or woman at moderate salary. They give the best kind of information as to condition of milk, and show which is clean and which is dirty.

2. *Pasteurization.*—When water is impure, the public demand that it be filtered and sterilized. Over 600 cities in the United States and Canada, including New York City, Philadelphia, Jersey City, Toronto, Buffalo, etc., are now sterilizing water with chlorine. Pasteurization can be quickly applied to all milk either by the milk dealer or by the city itself. It at once protects all milk consumers against disease. For the sake of safety, it should be required and regulated by municipal ordinances.

3. *Bottling.*—Retail milk should be bottled under sanitary conditions and dipping of milk from retail wagons prohibited.

4. *Grades and Standards.*—The final step is the establishment of definite grades and standards for milk. These relate especially to the sanitary character of milk before pasteurization. Their object is to identify clean and dirty milk and label them so that the buyer may exercise choice. Milk grades are recommended by the Commission on Milk Standards, consisting of twenty of the leading health officers and sanitarians of the United States and Canada. Their report grades milk into three

grades, A., B and C, with bacterial standards for each. It has been endorsed by the leading national associations of health officers, physicians, veterinarians and milk dealers. It is published by the U.S. Public Health Service. The grading of milk gives official recognition to the clean milk producer. It establishes a market for clean milk and gives a market value for cleanliness.

New York City has been the first to grade its entire milk supply in this way. All bottled milk is labelled A or B. This system has already proven to the municipal authorities its superior value over all other means for controlling the milk supply.

SUMMARY.

1. Milk is Nature's most valuable food product.
2. Milk is exceeded only by corn and beef as a product of the soil.
3. Milk is damaged by dirt and bacteria. Decency demands that all milk should be clean.
4. Any clean man can produce clean milk.
5. Cleanliness has a market value and market prices should be based not only on richness in butter-fat but on sanitary character as shown by bacterial tests.
6. Clarification contributes to the decency of all milk and the safety of raw milk.
7. Pasteurization is positively necessary for all milk for the sake of safety. It is the only guarantee.
8. There are no valid objections to pasteurized milk.
9. Certified milk is clean, but offers no guarantee of safety, and is too expensive.
10. Grade A milk, pasteurized, at ten cents per quart, has the highest public value because of its safety, decency and price.
11. Municipal milk control is just as necessary as the control of water supplies. It should include:—
 - (a) A bacteriological laboratory for testing milk.
 - (b) Pasteurization.
 - (c) Bottling.
 - (d) Grades and standards.

Clinical Note.

OPEN JOINT IN THE HORSE.

By G. MAYALL, M.R.C.V.S.

ON July 4th I was called to a black cart gelding that had been kicked on the outside of the off hock by another horse while out at pasture. The subject had been walked from the field where the accident happened to the stable, a distance of about 2 miles, and I examined him on arrival at the stable. Found the patient sweating profusely, blowing, and very lame on the off hind leg. There was a punctured wound on the outside of the hock joint from which blood and synovia were issuing. I had the patient put into slings, gave him a dose of physic, and supplied a bottle of 1 in 2,000 mercuric iodide solution to be injected into the wound three times daily. The next day the horse was easier, but the discharge was more profuse and the lameness no better, temperature 102° F., pulse 56. The mercuric iodide injections were continued for 4 days, but the horse did not improve. On July 9th cold water irrigation for half an hour 3 times daily, by means of a perforated india-rubber ring fixed above the hock and attached to some tubing leading to a tap, was commenced. After each irrigation the wound was injected with a solution of 1 part Lugol's solution to 4 parts of glycerine (as recommended by J. N. Frost, of Ithaca, p. 180 VETERINARY JOURNAL, April, 1915). This treatment was continued for a fortnight, at the end of which time the wound had healed and the lameness was very slight, although there was some swelling and heat in the hock joint. The horse has had the hock blistered twice since, and I see no reason why he should not be put to work again in a few weeks' time.

Translation.

TWO CASE REPORTS.

i. Births of Deformed Calves.

A cow in my practice is unfortunate enough to have given birth to several deformed foetuses. The animal is now about 10 years old and has calved 6 times. Of these six births, two have been normal, and the young were healthy. The cow is a powerful, well-set-up one. The stall which she occupies is somewhat dark, and the animal is regularly used for draught purposes. Any abnormality cannot be established clinically. Sexual life is normal, although the animal has not always conceived at the first service. The first calf was a healthy one. The second was deformed, and caused a difficulty in delivery. The head and fore feet were bent back and could not be straightened, but as the pelvis was roomy, deliverance was effected. There was complete ankylosis of the fore and hind extremities, and the vertebrae were curved. The foetus was as stiff and immovable as if it had been carved out of wood. The foetus was fully developed, but only about half the size of a normal calf. It was covered with hair. The cow had gone 41 weeks in calf. There was no trace of life in the calf. There was no illness of the mother after the parturition, and milk was plentiful.

In 1910 the cow calved normally without help, and the calf was a good one. On January 8, 1912, I was again called to her, and delivered a deformed calf, the presentation being a breech one. The foetus showed a similar condition to that in the previous case. All the joints were absolutely immovable. In the years 1913 and 1915 similar deformed calves were born.

The calves were by different bulls, so that the condition must have originated in the mother-animal.

ii. Strongylosis in Goats.

The diseases of goats are not well known; the goat is rather capable of resisting disease. In stall life this ability to resist declines so that tuberculosis is not uncommon. The intestine, however, appears to be resistant only in a minor degree. Acute fatal diarrhoea, and now and then chronic diarrhoea, are not uncommon.

In the Canton of Schaffhausen an attempt has been made to improve the race of goats by importing some good Toggenburgs. The land is suitable for grazing, and the goats are chiefly out of doors.

Two breeders have had unfortunate experiences with their herds. At the end of the summer acute diarrhoea was prevalent attacking from 80 to 90 per cent. of the younger animals. The acute form quickly killed the victims with loss of strength, emaciation and death. Chronic intestinal catarrh, followed by all the symptoms of pernicious anaemia as seen in the horse, developed. The anaemia appeared to develop as a result of the catarrh. At first I thought the cause was due to the cooked meal given to the young animals, and to them also getting a chill in the damp, wet weather, but as the catarrh could be cured and the anaemic symptoms persisted, I gave up this idea. The illness also arose in animals fed solely on milk, and housed, after being out to graze. Finally I suspected the pasture and set up a cadaver to the Veterinary Pathological Institute at Zurich, and also two ailing living animals.

The report came back from the Institute that the cause of the disease was a minute strongyle discernible with the microscope.
—*Swiss Journal of Veterinary Medicine.*

G.M.

NOTE—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

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THE
VETERINARY JOURNAL

NOVEMBER, 1916.

Editorial.

MEAT AND MILK.

THE prices of meat and milk are up. They have increased so much as actually to arouse the resentment of the consumer. The usual tinspot arguments dealing with the remedying of the inconvenience are being advanced. The butcher and farmer are being slated for their supposed direct part in the fleecing of the public. The shortsighted arguing fraternity are putting forward methods for checking the rise which, if expedient, do not deal with root causes; they scatter the froth but do not produce any impression on the body of the devouring wave. It is as hard to make the British public believe that a quart of milk is equal in food value to eight eggs or three pounds of cod-fish and far less in price, as to make them understand the real reasons for abnormal rises in price of commodities. Some advise meatless days, and others boycotting the milk suppliers. Few tackle the subject of increasing the number of bullocks, sheep, pigs and poultry, or the stimulating of calf-rearing and the production of cows worth keeping.

Scarcity of supply and artificial manipulation are the two ground factors that keep prices up. There is no evidence that there is any artificial manipulation, and agriculture is not run as a pastime to supply food at less than cost value. We have been content in palmy days of peace to scratch along with the milk supply, never going beyond the bare necessity of the demand. There has been quite insufficient propaganda work to put its value as a food and beverage before the man and woman in the street and quite a lack of organising ability in dealing with the demand and supply.

A man in discussing the expected great preponderance of women after the War said to me: "Well, matters will settle themselves, I think. Quarter of the women aren't fit to get married; quarter of them, although wishing to get married, will not be able; quarter of them will not want to get married; and the other quarter will metaphorically 'strike oil.'" So that really, according to this prophet, it will only be a matter of meeting the demands of 25 per cent. of the women. If the women play their cards right, and the men are discerning, there is therefore a chance of the 25 per cent. being fit and capable mothers, physically and mentally. Talking with a married lady recently who was running down the farmers' supposed avariciousness as regards the price of milk, I said, "Well, my Mother had thirteen children, and she never worried at all about the price of milk until each of us was a year old." It was a long time before she grasped my meaning and comprehended how the personal factor had a bearing on the price of milk; but the possession of the special attribute does not increase nowadays among the women. It is a case of atrophy following lack of use.

As we have suffered for our unpreparedness in martial matters, so must we suffer for our unpreparedness in food matters.

Over 12 per cent. of our population were employed in agriculture before the War. What percentage of effort was expended on its benefit or progress by the State?

It is foolish to look upon the farmer, dairyman, and butcher at present as more or less licensed pickpockets. The fault lies with our faculty of neglecting important things, which in the past has always been a more evident one, than our will and capacity to deal with them. It isn't a question of inability to find the money, the brains or the driving power. All these things can be found. It is just a policy of *laissez faire* and the fact that men with few exceptions make self-interest and the pursuit of wealth dominate their minds, and all things that really matter—national, social, and economic—are neglected in the piping times of Peace.

Whether, notwithstanding the great amount of rubbing of the eyes and yawning and attempts to wake up that are being exhibited now, things will be really different in the days to come is a matter that depends on national clarity of vision and the ability and will to see and do important things.

We have touched on these matters because the price of meat and milk and the factors controlling them ought to be at least as interesting to the veterinary surgeon as the price of petrol. We want to see a clear policy in these matters outlined and "something attempted, something done." We are afraid, however, that at present the right people to enable the advance to be achieved are not being consulted. As a sidelight on the matter the following extract from a recently published letter may be quoted :—

"I am a member of a County Committee and Chairman of a District Committee, but have to confess that our year's work is of a negative character, such as the extermination of docks, thistles, nettles and noxious weeds from roadsides and farms, the thinning out of rookeries and the destruction of wood-pigeons; about 800 acres of uncultivated land has been reported, and about 200 acres under-cultivated. No power over either of the latter classes being in existence, our reward is at present that the facts are in the pigeon-holes of the Board of Agriculture."

G.M.

SURGERY.

The usual hackneyed phrase put into the mouths of the prodigal son or daughter on their return home is: "How the old place has changed!" If past masters in the art of surgery were to return to-day, they would marvel greatly at the changed conditions of procedure and work in surgical fields. In the middle ages a surgeon had to be a plucky man capable of defending himself against insult and oppression, whilst his standing was about equal to that of a butcher or artisan.

Imprisonment or death was his reward if a wealthy patient died after being operated on by him. A French surgeon who failed to restore the sight of the King of Bohemia was sewn up in a sack and thrown into the Oder, whilst a celebrated operator in the sixteenth century, more astute than some of his fellows, obtained a safe conduct from the bishop, the patient, his master and friends before he commenced a critical surgical feat.

Fees were more difficult to obtain than at present, and medical volumes devoted much attention to the important question of how to treat patients so that they would be likely to pay the bill. Two ways of acting are indicated; in the one it was sought to cure the patient as soon as possible, and in the other to prolong the duration of the malady. The five classes to receive special consideration as regards quickness of cure are the poor, one's friends, the grateful, the notoriously bad payers (e.g., judges, lawyers, and officials in high positions), and, lastly, those who

pay cash down. Mandeville gives thirteen propositions explaining the art of lengthening out the malady in the case of the rascally rich.

Since the days we have indicated, we have changed; surgeons occupy a far better position, receive more respect, more regard, and are better paid. The art itself has advanced almost beyond recognition, and the whole knowledge of the necessary hygienic conditions to ensure good results in operations has improved vastly.

Perhaps as a class we possess a greater percentage of operators in our ranks than any other. Perhaps, too, we are the most heavily handicapped in regard to hygienic conditions after operating. It behoves us to do all we can to ensure the well-being of patients subjected to the knife. The reasonable use of anaesthetics (local and general), the boiling of instruments, the attempted sterilisation of the field of operation, are things that no up-to-date veterinary surgeon will omit. Even tooth forceps should be sterilised before use.

We think that there has been much advance in the methods of the practice of veterinary surgery in recent years, but the pretty little ways of clients remain to some extent the same as in Mandeville's day.

G. M.

WE think that the anomaly is that a British graduate can practice in Australia, New Zealand, India or Canada without sitting before a board of examiners in those countries, but if he goes to America he cannot. Politically and constitutionally, of course, this is perhaps desirable, but it isn't evidence of what Mr. Mayo calls a "square deal," any more than it is evident that an M.R.C.V.S. belongs to "a holier than thou" class, because he has to sit before an American board before he is given a licence to practise in America. If there is a "holier than thou" feeling (and we don't admit the impeachment), then it appears to be on the American side and not on ours.

The question as to what is educationally the best procedure in any country is one that can be argued until the "crack of doom," but history, both made and being made, is full of examples to show that "each country" does not "naturally develop its education more in certain lines than experience has proven most useful to it."—G.M.

Original Communication.

NOTES ON INDIAN HEMP, CANNABIS INDICA, AND HENBANE (HYOSCYAMUS) IN CANINE AND OTHER PRACTICE.

By FRED. C. MAHON, M.R.C.V.S.

INDIAN HEMP: A Narcotic, Anodyne, Antispasmodic.

Henbane (Hyoscyamus) Hyoscine: A powerful cerebral and spinal sedative, with its action on the heart expressed to a moderate degree, and used in combination with Morphine as a valuable auxiliary.

I have employed it in cases of colic, and found it act surprisingly well, after Chlorodyne, Physostigmine, Arecoline Bromide, and other drugs failed to afford relief.

Recently I have used both Indian Hemp and Hyoscine somewhat largely, and hope to do so in the future extensively.

In brain affections when Indian Hemp failed to afford sleep, so badly needed, I accidentally, so to speak, thought of Hyoscine, which fortunately I had at command.

Whether the previous use of Indian Hemp interfered with the action of the Hyoscine cannot be definitely proven, but it was some 18 hours, after 3 doses of the same had been administered (at intervals of 2 hours, in the strength of 1-200th grain), that sleep was induced, and my patient, a bulf-dog, had some relief, and after some weeks, save occasional moanings and general uneasiness he was progressing fairly well.

The history of the case where Hyoscine has done marvels is briefly as follows:—

Some four months ago, my patient was treated for distemper by a neighbouring practitioner, the sequelæ of the attack resolving itself into brain mischief, and undoubtedly Meningitis. Frenzy, irritability, marked restlessness, moaning, howling being the chief symptoms I first encountered. Morphia and Atropine had been largely used by the dog's former veterinary surgeon, and in large doses without effect. Prognosis was unfavourable, and destruction advised. I was then asked to do what I could, and to a particularly bad case.

One noticeable feature of my patient was that he could progress in a forward direction, and in a straight line fairly evenly, but on turning round he faltered, and the hind-legs crossed somewhat. This was particularly noticeable if the dog turned to the right, slightly so if to the left.

His appetite capricious. Oatmeal biscuits with cream seemed to be the only food he liked. Bovril, milk, raw meat, cooked

meat with which tempted by his mistress, he refused. The dog after some 5 weeks is not wasting by any means. Bowels, kidneys, both perform their functions on the whole regularly and well. I analysed the urine, but found nothing out of the way. Sleep is fairly good. Only 2 bad nights in 5 weeks. When moaning and howling are too frequently expressed, 1-200th grain of Hyoscine seems to be the only remedy to afford sleep and general quietude. Occasionally the cardiac pulsation is tumultuous, so I prescribe Strychnia, Sparteine Sulphate, and Digitalin (Parke, Davis and Co.'s) Tabloids, which seem to act well and steady the heart considerably.

Before further consideration of the action of drugs in cerebral and meningeal affections, may I allude to the two diseases and tabulate what according to the great surgeon (Aitken) distinguishes the two affections.

1. Cerebral Disease.

- a. From the outset, or from a very early stage of development, there is loss of some one or more of the proper nervous functions, such as paralysis, anaesthesia, loss of memory (man).
- b. Cerebral disease is not commonly attended by a high temperature. Exaggeration of function marked, however, such as delirium, convulsions, intense hyperæmia, or tenderness.
- c. Little vascular excitement, attends cerebral disease, nor is there frequently any highly marked general disturbance.
- d. Paralysis and Anæsthesia —Loss of volition, idealism, perception, and the like, characterise cerebral disease.

2. Meningeal Disease.

- a. It is not till some time after the detection of signs of disease that diminution or loss of nervous function takes place.
- b. The subsequent diminution or loss of nervous function, which succeeds the prolonged existence of "Head Symptoms," is generally preceded in cases of meningeal disease by extremely severe excitement or exaggeration of functions, such as pain, tenderness, furious delirium or convulsions.
- c. In meningeal affections there is usually much local vascular excitement, with general disturbance.
- d. Spasms or convulsions, pain, delirium are the general features of meningeal disease.

I may add that during the first few days of my attendance the peculiar moan or whine was so pronounced, and of such a

character, that I was dubious as to whether I had a case of rabies to contend with, so kept very careful and close observation on my patient, also warning owner as to care in dealing with him. But the symptoms closely approaching this terrible disease passed away, and my fears too.

In employing Henbane one must be prepared for many symptoms, such as dryness of the mouth and throat particularly. I ease these with glycerine and syrup in equal parts, smearing tongue and gums thrice daily; also mix a little in the food.

The above-mentioned symptoms presented by Henbane at its onset disappear to a very great extent after a few doses have been administered. If used hypodermically, apparently less dryness of mouth and throat occur--from my observations at least.

Compared with Opium, Hyoscine acts less on the brain and more on the heart and general circulatory system. It does not, however, diminish the secretion of the bowels or kidneys, it dilates the pupil, and as compared with Opium is less effective as an anodyne or antispasmodic. The chief uses to which hyoscine seems most applicable are in brain affections, and allied inflammatory conditions following the result of the poison of, distemper or influenza in dogs and cats, and its employment in these cases I strongly recommended:—

1. Hyoscyamine conveniently used as a sulphate, like Atropine and Daturinie, stimulates, shortly exhausts, and paralyses the sympathetic system.

2. After a brief stage of preliminary excitement, it lowers the force and frequency of the circulation; large doses cause paralysis of the capillary vessels and respiratory arrest, dilates the pupil, and parches the tongue and mouth.

Small doses accelerate the movements of the intestines, and I have used it alternately, with hypodermic injections of Strychnia, in the dog, with excellent results.

In one case I used it where I had Faecalstasis in an aged retriever. No faeces were passed for 11 days, and recovery ensued. During this period 20 grs. of Hyoscine, and nearly two of Strychnia were employed.

Am about to try equal parts of Parafinum Liquidum, Glycerine, and 1-200th grain of Hyoscine on my next case, should it be encountered.

In diseases of the cerebrum I pin my faith to Indian Hemp as a narcotic; in meningeal affection Hyoscine, being guided by the subtle differences quoted from Aitken.

In canine practice where facilities exist for studying cases closely, I should like Professor Wooldridge to experiment with these two drugs in the two afflictions mentioned above, and record his experiences with the same.

Further, Hyoscine resembles Belladonna and Stramonium by first stimulating and subsequently exhausting and paralysing the sympathetic nervous system.

In tubercular meningitis proved by post-mortem examination in the case of a Jersey cow recently, after administration of 8 ozs. of Tinct. opii I had no amelioration of the Meningeal Frenzy, sudden in its onset and marked at first by symptoms of "Milk Fever."

Never have I witnessed such a state of excitement in the so-called Placid Ruminant.

The initial struggles lasted two hours (Cowman's statement). Profuse perspiration, bellowing, throwing head on floor of large roomy barn, with such force as to be heard some distance away. Injected conjunctival membranes. Temp., 104.3 deg. F. Pulse, 90 per minute. I administered secondly $\frac{1}{2}$ grain hypodermically of Hyoscine, per os 8 drs. of fluid extract. Case being hopeless, I had the cow destroyed. Tuberculosis markedly shown. Cerebrum fairly healthy. Meninges inflamed with considerable tubercular deposits. . . .

Referring to Finlay Dun, Hyoscyamus is occasionally prescribed to quieten tumultuous action of the heart, occurring especially in valvular disease. In such cases it will sometimes reduce the pulse of the horse from 60 to 40 beats a minute. Relaxing muscular fibre, and antagonising capillary congestion, it relieves the pain of rheumatism and lumbago, also neuralgia. Given internally as well as by injection, it abates irritability and spasm of the uterus, bladder and intestines.

As a calmative, antispasmodic and substitute for Opium, Mr. Mayhew prescribed it for dogs suffering from distemper, giving half a drachm of Ether, with half a drachm of Tinct. Hyoscyami in cold soup. Combined with drastic purgatives, it prevents griping, without diminishing purgation. French veterinarians use it in epilepsy, chorea, and amaurosis (Delafond and Lassaigne).

Narcotics.—Headland defines a narcotic (Opium, Indian Hemp, Belladonna) as an agent which passes from the blood to the nerves and nervous centres, and acts so as at first to exalt

nervous force, and then to depress it, and has also a special action on the intellectual part of the brain.

Some narcotics, such as Belladonna, Hyoscyamus and Indian Hemp, cause considerable preliminary excitement, and in large doses delirium, and form the connecting links, as it were, between narcotics and such stimulants as Alcohol and Ether.

The property of narcotising the cord, as well as the brain, of the lower animals brings these agents into near relationship with such depresso-motors as Hemlock, Calabar Bean and Chloral.

Henbane resembles Belladonna, but paralyses more notably the cerebrum and motor centres, and stimulates less powerfully the sympathetic, dilates the pupil, diminishes mucous secretion, and relaxes muscular fibre.

Indian Hemp induces hallucinations and delirium rather than stupor, increases rather than diminishes secretion, and is chiefly used as an antispasmodic, notably in tetanus. Narcotics are given to relieve inordinate nervous action, thus they abate the spasms of colic chorea, and tetanus. They diminish the irritability and excessive discharges of chronic cough, bronchitis, diarrhoea and dysentery, alleviate gastrodynia and chronic vomiting in dogs, and blunt the pain of wounds, rheumatism, pleurisy, and other inflammations. To ensure, however, their full effects, they should be given at intervals of one or two hours. Most narcotics contain active concentrated principles which can be conveniently and effectively used hypodermically.

Indian Hemp I usually use as an electuary. Hyoscine I prefer to employ hypodermically.

In colic I have used Chloral Hydrate 40 grs., followed by 3 grains of Morphine, repeating same in an hour, especially in brewery and coal horses. I once used the small dose of 10 grains of Chloral to 1 grain of Morphia, and had what I consider bad results. The pony (a Shetland), however, did well. The aggravated symptoms of intestinal pain increased directly I used the same, and I attributed this to some constitutional repellance or idiosyncrasy of the patient to these drugs.

No hard and fast line can be drawn when using drugs. Constitution, I aver, of an individual or animal plays a great part in resulting death or recovery, especially with narcotics. This I have often proven in a long course of years now as a veterinarian.

To say one agent is a specific for a disease is not true—a combination of drugs seem to prove the best so far as my experience goes—and is that doubtless of many observant practitioners.

Works alluded to:—

Finlay Dun's Veterinary Medicines.

Williams' Medicines (Veterinary).

General Articles.

ROUTINE OF DISINFECTION.

By W. JOWETT, F.R.C.V.S., D.V.H.

AFTER removal of the infected animal or animals from a stable or other building it is imperative that the latter be thoroughly cleansed and disinfected before allowing other animals to gain access thereto. This cleansing and disinfecting process must be carried out in a methodical and thorough manner to be of any real service, otherwise, by giving a sense of false security, it is worse than useless.

First, the walls, windows, doors, ventilators, and fixtures must be brushed down to remove cobwebs, dust, and dirt; next, the plaster and limewash should be scraped off the walls. The material so removed, together with all litter, bedding, and food left in the mangers, should be collected in a heap and *burned* either inside the stable itself, or, if on account of the materials used in the construction of the building this appears dangerous, then just outside the stable door. Combustion of this material may be facilitated by pouring a little paraffin over it prior to applying a light.

Next, the mangers, fittings, and partitions require attention. These should be scrubbed with a solution of soap in hot water containing one or other of the disinfectants mentioned, preferably cresol (Jeyes' Fluid, Creolin-Pearson, etc.), and this may also be applied by means of long brushes or mops to the walls, particular attention being paid to that portion of the wall near—and especially to that in front of—the manger. In the case of very old and dirty mangers and fittings a hot solution of soda (washing soda or caustic soda) may be needed to remove grease and dirt.

After this preliminary cleansing we may proceed with the disinfection proper. In applying the disinfectant solution a spray pump may conveniently be used, the disinfectant being sprayed over the entire surface of the walls, floor, mangers, fittings—in fact, on to every part of the anterior of the building. Where, however, a spray pump or hose-pipe and force pump is not available, then one must apply the disinfectant solution by means of mops or brushes. Whichever mode is adopted, great care must be taken not to overlook and omit introducing the

disinfectant into all corners, angles, and crevices. Hot solutions of the disinfectant (*i.e.* solutions made with hot or boiling water) should be used in preference to cold ones.

If a poisonous disinfectant such as corrosive sublimate be used, one may eliminate all danger (*e.g.* accidental poisoning of animals from licking walls, etc.) by practising a second spraying or washing of the disinfected surfaces with clean, cold water some hours after applying the disinfectant.

Finally, all doors, windows, and ventilators should be opened to allow free access of air and light, and one may then proceed to limewash the walls and, where necessary, to paint the fittings.

The limewash should be prepared with fresh unslaked lime, and to each bucketful of the limewash a half pint or so of cresol, creolin, or of Jeyes' fluid or similar proprietary disinfectant may be added with advantage—or, if preferred, one may add 6 ounces or so of formalin to each gallon of limewash. The limewash can be applied to the walls either with brushes or by means of a spray pump.

Should the floor of the stable or building be of earth, it is advisable to dig up and remove some four or six inches or so of the surface soil, which, after removal, should be burned or mixed with quicklime, chloride of lime, or other reliable disinfectant. The earth so removed should be replaced with fresh soil from an uncontaminated source, or, better still, and whenever possible, a new floor of concrete or other non-absorbent material should be laid. If the floor is of concrete or similar impervious material, it can, of course, be cleansed or disinfected in the manner above indicated for walls, floors, mangers, and fittings.

Pails, buckets, brushes, curry-combs, and other stable utensils which have been used in connection with infected animals may be disinfected by immersion for a few hours in a solution of cresol (or of one or other of the proprietary disinfectants consisting largely of cresol, such as Jeyes' Fluid).

Blankets and horse-rugs may be disinfected in a similar manner, remaining in the bath for twelve hours or longer. One authority recommends that when dealing with outbreaks of disease in instances where receptacles for such baths are not

obtainable, one may make a bath of any reasonable size by digging up a portion of ground, removing the soil, and covering the bottom and sides of the depression so made with a sailcloth or wagon-cover. After testing with water to see that it is watertight, the necessary amount of disinfectant solution may be poured in. The blankets should be opened out one by one, laid in the bath, and care taken to see that there is always sufficient disinfectant present to more than cover them.

Leather work and leather goods should not be steamed or boiled or treated with "formalin." The best procedure in disinfecting such articles is to scrub them with soft soap and water, after which they may be immersed for some hours in a bath of cresol or "creolin."

In disinfecting harness which has been used on animals the subjects of certain parasitic diseases, such as mange ("brandziekte"), particular attention must be directed to the stuffing and lining, which it is often better to remove and burn, afterwards disinfecting the leather work in the manner above indicated, and subsequently having the saddles and collars lined and stuffed afresh.

Litter, manure, and bedding used in connection with animals which have been infected with diseases, such as anthrax ("miltziekte"), glanders, tuberculosis, black-quarter ("sponzietke"), and of parasitic diseases, such as mange, should be burned in every case. This may be carried out by collecting the material in a heap, pouring paraffin over it, and applying a light. If for any reason this is impracticable, then the manure must be most thoroughly disinfected and buried as deeply as possible. Manure, litter, and bedding may be disinfected by mixing with them lime (quicklime) or chloride of lime, or a disinfectant such as cresol or creolin (and in the writer's opinion the two last-mentioned disinfectants are to be preferred for this purpose). In this event the mass of bedding or manure must contain the requisite proportion of disinfectant—it is not sufficient merely to add a quantity of, say, 2 per cent. cresol or creolin to the mass, the latter must contain 2 or 3 per cent. of cresol or the correct proportion of any other appropriate disinfectant which may be used.

Cattle markets, pens, sale yards, and auction yards, as well as cattle trucks and boxes, may be disinfected in a manner simi-

lar to that described in the foregoing pages as for disinfection of stables and cowsheds. The Stock Disease Regulations of this country provide that such enclosures or buildings must be cleansed and disinfected "at the close of each day during which they have been used," and in the case of trucks and horse-boxes "before they are again used for carrying animals," the cleansing and disinfection of the latter being carried out as follows:—

They must be (*a*) swept and, as far as possible, scraped; (*b*) thoroughly washed and scrubbed with water; (*c*) sprayed with a disinfectant; and (*d*) finally limewashed.

The disinfectant used for this purpose should be at least equal in germicidal action to a 5 per cent. solution of pure carbolic acid (crystals). For this purpose either formalin, or an alkaline solution of cresol, would seem to be as useful and reliable as any.—*Disinfectants and Disinfection.*

WHAT IS WRONG WITH AGRICULTURE.

RURAL EDUCATION AND THE VILLAGE SNOB.

By A. T. JOHNSON.

THERE are only two things that really matter these days—munitions and agriculture—and they are interdependent. It is these two which are the basic source of German strength, and they are the weapons which, in the hands of the Alliance, will ultimately smash the power of the Central Empires.

In those days the necessity for our present vast output of munitions of war will wane, but the necessity for a well-organised and efficient system and practice of agriculture will remain, if, indeed, national economics will not compel us to pursue it with greater vigour than we have ever yet dreamed of.

For farming is, after all, the fundamental origin of all wealth and national prosperity. It is, furthermore, the industry which breeds and nourishes not only the great bulk of the man-power of these islands, but it is the field and furrow of the "Old Country" which are the cradle of those up-growing nations of the British Empire beyond the seas.

And for many years to come those great continents and dominions will look to us to provide them with sturdy sons and daughters so that the good work of our earlier pioneers may be carried on and the well-being and solidarity of the Empire maintained and assured.

A PAUPERISED INDUSTRY.

How are we treating this very foundation and buttress of our national existence? What is its position as a productive factor to-day, especially in view of the fact that nearly the whole of Europe is engaged upon a business of destruction?

One need not return to the pre-war years when agriculture was permitted to muddle along pretty much as it liked, when the farmers' appeals for protection fell upon deaf ears, when the State neglect of our primary industry was a by-word among European nations, and when, through our own shortsightedness and stupidity, millions of our sturdiest sons were driven to take refuge in the towns and other lands. One has only to consider the present price of food stuffs and to imagine where we should be—where we should have been long ago—if had not our ocean-carrying food ships been less efficiently protected against the enemy, to realise the inadequate condition into which we had allowed our machinery of home supply to drift.

Whilst merchants and middlemen gambled with our overseas wheat and waxed fat on corners in bacon—even as they are doing to-day to their everlasting shame—home agriculture, the producer and elemental source of all food and real wealth, was methodically pauperised. As for the public, we were living in a fool's paradise with about a fortnight's supplies to go upon.

What we are doing with our greatest productive power is hardly more satisfying than what we have done. We are waking up drowsily to the fact that something—some land—ought to be secured for "the boys" when they come home. But whether we re-populate 6,000 acres or 60,000 with ex-service men it will be of little account to the future welfare of agriculture. Such schemes, like the smallholdings attempts in various remote parts, are a mere "drop in the ocean" compared with the enormous magnitude of the task which confronts the people of this country in the regeneration of British agriculture.

These isolated and, in a sense, private efforts are better than nothing, and indicate that a wholesome, if not very active, spirit in favour of land development is alive. But we must go further than that, and it is my belief that nothing short of an entire re-modelling of our rural education of the rising generation will be of much avail.

A RACE OF SNOBS.

A well-known chairman of a county educational committee was roundly accused the other day of being an arbitrary and despotic Tory, an oppressor of the poor and what not, because he had the courage to state that it were wiser in the interests of the individual and the State to teach the country child to hoe turnips well rather than to play the piano badly. But he struck a note of ringing truth, for there is no escaping the fact that, instead of bringing up a healthy and prosperous peasantry we are, by our educational system, propagating a race of unhealthy and ill-mannered snobs.

"Our existing system of rural education," to quote the Education Committee of the Central and Associated Chamber of Agriculture, "tends to educate the village boys and girls away from the land rather than to fit them for a career on the land." The results of this misguided policy were manifest before the war in our deserted fields and villages, in the scarcity of farm labour, in the congested cities, and in the wholly inadequate production of home-grown food. Our criminal neglect of this first duty of State is now being brought home to us with an acuteness that is beginning to sting.

The village boys and girls of to-day have "gone beyond" the honest toil of the field. They turn up a nose of contempt at the work their fathers and mothers did. The one has become a young blood with an office stool and a boiled shirt as the end and object of his ambitious soul; the other apes the lofty realms of the flapper, unconscious of the obvious fact that she does it very badly.

Both get into mischief, or are counted among the lucky if they do not. Both of them are snobs in the meaning of the word that leaves no room for doubt. They are idle and they are unproductive. They are a source of anxiety to their parents, if the latter happen to be of the old school, and they are objects that demand such delicate, kid-glove treatment, such servile consideration at the hands of an employer that most of the latter would now rather do the work themselves, or let it go undone, than be bothered with them and their superior airs.

Even the women from the cities whose ready response to the call of agriculture for helpers might, one would have thought, have brought the blush of a conscience pricked to the cheeks of these parochial parasites, have had to suffer their gibes and empty laughs of scorn.

THE NOBLEST NATIONAL WORK.

It is no use hoping, as I have inferred, to redeem agriculture by substituting for these peasant prigs, unbalanced products of a misapplied education, a few town-sick men and women. Land settlement and other schemes will do no more than touch the fringe of an immense problem. What we have to do is to secure the youngsters of the rural village; to save them from being inoculated with that distaste for country life which has possessed their demoralised elder brothers and sisters.

And the only way in which that can be done is by remodelling our school curriculums—which need not imply any narrowing of education—by engraving upon the children's minds that agriculture is, rather than being a humiliating calling, perhaps the greatest and noblest of all national work.

We have still a nucleus to go upon which is the most precious of all our inheritances, but it is a nucleus which, once it were lost, could not be recovered for generations, if ever. And if, concurrently with this revised training, some of those millions which are spent in chasing the rainbow end of experimental settlements were to be devoted to the better housing and greater comfort of our existing peasantry, that solid foundation of British man-power and citizenship so essential to the existence and prosperity of the whole Empire would be achieved.—*Daily Dispatch.*

Canine Clinical.**CASE OF CALCULUS IN THE KIDNEYS OF A DOG.**

ON September 25th I was called to see a four-year-old retriever dog said to be suffering from difficulty in passing water. On arriving, I found the dog looking rather dull, with a temperature of 103° , slightly stiff in the hind limbs while walking, but not suffering any pain. The bowels were acting and appetite good. He passed water while I was there, without straining. As he looked lively, and his master wished very much to take him on the moors grouse-shooting that day, I consented, leaving some diuretic medicine and a small dose of physic to be given after his return during the evening.

The next day being very foggy and a cold east wind, he was not taken out. The following morning I again saw him, and all indications showed him to be improving, except the temperature had risen half a degree.

In the evening he was brought over to my home, much worse and looking very dull. He had passed neither urine nor dung during the day.

On examination I could not detect any calculus in the bladder or urethra. Apparently he was suffering no pain. The m.m. of the eye was a shiny yellow colour. Breathing normal; pulse right. From the floor of the abdomen and rising up each side for about 4 inches, was a fairly hard swelling which I could not account for.

I tried two doses of oil and some diuretic medicine, but these were vomited up in 2 or 3 minutes. I then gave a dose of cascara evacuant, which was retained, also enema, and all was done that could be done for his comfort. Next morning—found neither urine nor dung had been passed through the night. Dull, but no pain; gave him egg and milk, which was retained. In about two hours I gave $\frac{1}{2}$ dram. resin mixed with hard soap to a bolus, including four purging pills. At noon I gave some beef-tea, which was vomited immediately. In the evening more egg and milk, which also was vomited immediately. At bed-time he passed a fair quantity of water and some liquid faeces.

There was still no pain; only weakness and dullness growing more pronounced.

Death took place during the night. On P.M. I found quite a quart of bloody-coloured water in the abdominal cavity. The bladder was about quarter full and the walls were thickened. Communicating with the abdomen, I found a small aperture about the size of a pin's head, through which I could make urine flow on pressing bladder. The edges of the aperture were black. I did not see any ulceration in the bladder. The kidneys were enlarged and inflamed, one containing a quantity of dirty-looking pus, and each contained a calculus—one about the size of a haricot bean and smooth, the other about the same size but flatter, and with a rough surface and which was easily broken down.

Liver dark in colour and slightly enlarged. Gall bladder full. The owner said the dog had been unwell for one day about a month ago, but the next day he was all right.

Thinking that this might be of interest because of the absence of the evidence of pain in this case, is the reason of my submitting it to you.

"A COUNTRY VET."

Translations.

A MODIFICATION IN THE TECHNIQUE OF THE CASTRATION OF MARES.

By Dr. E. GRAUB, Veterinary Surgeon to the Cavalry Remount Depôt at Bern.

THE castration of the mare is nowadays exclusively performed from the vagina. The method by incision in the flank is to-day generally discarded.

Castration of the mare is an operation in which asepsis—as far as we are able to achieve it—offers the only security for a technical good result.

The vagina of the mare is by nature not a carrier of pathogenic micro-organisms, as we shall see later on. A post-operative infection is as good as excluded if after the operation one does not concern oneself any more about the vaginal wound and its cleanliness. Each irrigation after the operation and later on is not only superfluous, but directly injurious, and carries in itself the possibility of an infection. The exit of the vagina furnishes sufficient security against a subsequent infection from without. But it must be borne in mind that one must leave this door as much as possible intact, in order to be sure of the safeguard. I think less of mechanical lesions to the vagina than of unnecessary rents in the mucous membrane of the organ inflicted during operatory preparations which have, as a result, the subsequent uneasiness of the patient with constant pressing and straining. I consider that the preparatory disinfection of the vagina can easily be carried too far. An eroded or chemically irritated mucosa subsequently becoming inflamed forms an extraordinarily favourable region for bacterial invasion, whilst the intact mucous membrane furnishes just as great a hindrance against external infection. But a preparatory disinfection carried out with consideration and moderation and the observance of asepsis are necessary for good results to accrue. So much for asepsis and antisepsis in this operation. Before operating the animal should be put on half rations, little voluminous in character. On the day before operating all food should be withheld.

Castration is best performed with the subject standing. Operation on the recumbent animal is possible, but very troublesome for the operator.

A dose of 40 to 50 grammes of chloral has in most cases a very quieting influence on the patient. If necessary, the mare's head may be fixed on both sides and a girth or sack put under the chest to hinder her lying down. To prevent kicking, the hind legs may be fastened at the fetlocks with pretty strong rope. A band over the loins and croup will prevent the hind quarters being raised too high. In case of necessity, one can stand behind a door of convenient height. Failing this, a long and strong piece of lattice work may be held by assistants and raised or lowered as required. The operator is in this way protected. If, in spite of this, the subject tries to squat down and kick, the operation is very difficult to perform. In such cases nothing remains but to be very patient and await quiescent moments. Finally one accomplishes one's object.

After the rectum has been emptied, where possible not by the operator himself, the tail is plaited, bound up and raised. The vulva and its neighbourhood are washed with soap, disinfected with sublimate and then alcohol. The hand and arm are similarly prepared. The india-rubber tube with glass funnel attached, previously disinfected in sublimate solution, is now introduced into the vagina with the hand, and commencing with the vestibule, and holding the tube always in the hand, the whole wall of the vagina is washed out and continuously irrigated with a one per cent. therapogen solution. During this procedure the bladder may as a rule be emptied by exerting slight pressure on it. This need, however, cause no anxiety. The urine of the healthy horse is sterile. With two vessels each holding about 4 litres (7 pints), disinfection of the vagina is fully accomplished. A greater quantity is unnecessary and only irritates the mucous membrane. After the fluid lying on the floor of the vagina has been allowed to escape as far as possible, the hand and tube are withdrawn. After the most careful preparation loose hairs may be attached to the forearm and round the vulva, so that after each withdrawal of the arm the vulva is washed with a weak therapogen solution. The solution is allowed to flow also over the elevated hand, elbow and forearm.

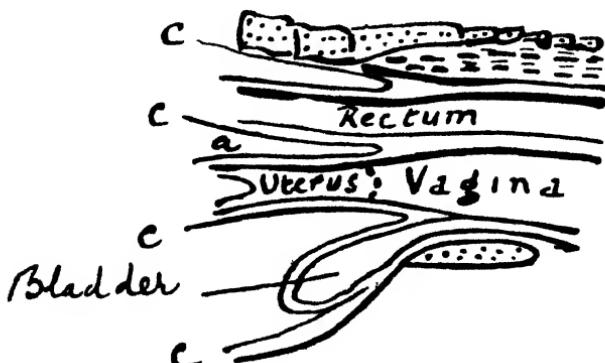
For the vaginal puncture I use a straight, covered bistouri attached to a chain. The blade must be broad and not sharper than a badly ground table-knife. The perforation of the vagina by a puncture is preferable to an incision in the vaginal mucosa. In opposition to the hitherto general practice I make my opening in the vagina below.

On the advantages and disadvantages of this procedure I will descant afterwards.

The bistouri is closed, pressed by the thumb against the other outstretched fingers and introduced into the vagina.

On the floor of the vagina one plainly feels the anterior edge of the pelvis (*pecten ossis pubis*). Somewhat further forwards one comes to the external orifice of the uterus. One sets the points of one's fingers under the orifice and presses slightly cranialwards, thus the floor of the vagina is stretched and is to be felt as a long tight membrane about 10 cm. in extent, reaching from the edge of the pelvis to the mouth of the womb. In this stretched mucosa the bistouri with the blade shoved forward by the thumb is thrust forwards and downwards by slight continuous pressure close behind the orifice. With the drawing back of the knife one inserts the forefinger into the puncture opening, shoves the blade back into the knife with the thumb, and allows this to be drawn back by an assistant pulling on the chain. When one has thrust the forefinger into the puncture opening on the floor one feels in its depths the empty, thick-walled bladder and loop of small intestine. The forefinger is now cautiously drawn back but only so far that the point of the finger still remains in the opening. The middle finger is now introduced alongside the index finger in the opening; by slight pressure the wound is widened till this finger is completely through. Successively, in this way one procures a wider opening until the wound is penetrated by the other fingers, and will finally admit the whole hand. Entering the abdominal cavity one turns the palm surface of the hand towards the back bone and thus feels the body of the uterus in one's hand. Tracing it forward one comes to the bifurcation of both horns. Following the right horn one unfailingly comes to the right ovary. Just the same on the left side. This locating of the ovaries offers not the slightest difficulty. The anatomical relations are so simple and

clear that for those doing the operation for the first time, a non-discovery of the ovaries or a mistake is wholly excluded. After one has thus located the position of the ovaries, the hand is drawn back and the chain écraseur introduced. Alongside the body and horn of the uterus one feels one's way to the ovary. This reached, one thrusts the horizontally-held noose up over the ovary, or otherwise one lets the ovary fall into the out-spread noose of the chain which is slightly tightened by an assistant. The palm of the hand is always turned upwards; one holds the instrument up by light pressure with the base of the hand, and thus has all five fingers free in order to push away and control threatened loops of intestine, so that actually only the ovary is included in the noose of the chain. On drawing up



SECTION THROUGH THE PELVIC CAVITY.

- a—Excavatio recto-uterina.
- b—Excavatio vesico-uterina.
- c—Peritoneum.

the écraseur chain the mare now makes violent defensive movements. At this time, and later on, especially if the movements are very violent, the greatest care must be taken that no rents occur in the ovarian ligaments. The avoidance of this is not difficult if the operator during the whole act of snaring and removing the ovary bears the ovary and the écraseur in the flat hand and at every defensive movement supports the elbow and under arm on the floor of the pelvis and lifts the ovary and the écraseur towards the backbone with the hand. At the same time by this means the uterus is also supported, and a rent of the lig. lata hindered.

The removal of the ovaries is only slowly accomplished, and

takes about 8 to 10 minutes for each ovary. It often happens that bits of tissue are drawn through the slot of the écraseur by the chain, and the ovary does not come away by itself. In this case the ovary now firmly situated at the end of the instrument must be twisted until resistance ceases. By loosening and thrusting out the chain from the shaft of the écraseur by the assistant, everything is loosened, and the ovary comes away. Cleanse as indicated, and proceed in the same way on the other side.

The mare is freed and led into a stall. The hind-quarters are raised and the patient tied up. Dietetic measures are not indicated, but proffered hay is always taken with good appetite after the operation.

Now what are the advantages and disadvantages of making the puncture in the vagina *below*? Let us make the anatomical conditions clear. (See figure.) Above, the vagina coalesces with the rectum to its greatest extent. On its dorsal surface the peritoneum attaches itself to the body of the vagina close behind the crossing of the uterus in the vagina to pass over directly to the rectum and thus forms a table between vagina and rectum (*excavatio recto-uterina*). In foals and mares which have not been pregnant, this *excavatio recto-uterina* is not at all deep (Dégive). The puncture place *above*, which according to circumstances cannot be quite determined, is only very limited; for the coalescing proportions between vagina and rectum one can never foresee. On this account the puncture above is always made in the dark. And if one does not succeed in fixing the vagina firmly in this procedure, the rectum and large vessels always lie in serious proximity.

More certain and clearer are the anatomical relations in puncture *below*. In the background lies the cervix uteri. Eight to ten cm. backwards the anterior edge of the floor of the pelvis may be felt. Left and right of this the art. and venæ iliacæ, whose course may be plainly determined. Under the vagina lies the bladder, which alone, in making the puncture, is in danger of injury. That this danger is extremely small, and in carrying out the described technique hardly arises, is shown from what follows. During irrigation of the vagina and cleansing of its walls with the hand, a massaging effect is carried out on the bladder, which irritation causes it to be regularly emptied. The

bladder also at the moment of operating lies hanging in the abdominal cavity as a slack sack above the pecten ossis pubis. The peritoneum covers uterus and bladder and forms analogously the excavatio recto-uterina above and the excavatio vesico-uterina below. This table in the mare is regularly rather deep, the vagina and bladder coalesce with one another from the neighbourhood of the anterior pubic edge right away backwards. If one now stretches the under wall of the vagina, as described in the operation, thus one can introduce the covered knife close behind the external os and with a forward and downward thrust of the blade penetrate the abdominal cavity with safety, without touching any other organ with the point of the knife. It must be understood that one awaits a moment for the puncture when the abdominal muscles are not fixed and the animal is not pressing and straining. Otherwise the situation of the puncture ensures no protection.

It is advisable in the castration to make the opening in the vagina by means of a puncture with subsequent blunt widening (fingers) than by one extensive or several incisions. A vigorous puncture is perhaps better than a hesitating one. But how far a puncture goes in this delicate region, where everything is very movable, where one depends entirely on the sense of touch and where the topographical conditions are not easy to survey, is difficult to determine. For the rest there is slow continuous pressure of the knife through the vaginal wall. Should another organ come within reach of the puncture it will in all probability be pushed away without injury. For only a well-stretched body is punctured in this way; a slack, movable one is always avoided.

A vaginal speculum is superfluous. When using one the hand has to be inserted and withdrawn three or four times, and this encourages infection. The blunt widening of the puncture when made below offers no difficulties. The widening movement downwards and forwards is easier for the hand than upwards and forwards. That with this procedure the ovaries can very easily be found is quite plain.

The chief precaution, on which I lay great stress, consists in fixing and supporting the uterus and its stays in the normal position, so that in case of the most violent and startling defensive movements of the animal no tearing of the suspensory appara-

tus of the genital organ can occur. Colic and unrest after the operation continuing all day in some cases, and described by authors, are exclusively due to tears and bruising of the suspensory apparatus of the uterus and ovaries. If the procedure here indicated is carried out, not only will quiet mares do well, but animals that have been very violent and in which one might expect all sorts of complications recover uneventfully.

In the operation through the vaginal opening above, the support of the uterus from below and removal of the strain from the lig. lata is not possible since the hand and the arm lie between the rectum and uterus. On the contrary, by the introduction of the hand into the abdominal cavity the cervix uteri will be pressed down and the lig. lata stretched. In violent movements the stretching must be such that it may easily lead to tearing.

The possibility of a hernia or an incarceration as in all perforating vaginal wounds must be granted. Still, the probability of such an accident is very small. Up to now I have never seen it.

The thought may arise that in this modification of the operation, as the puncture is on the floor of the vagina all secretions will gravitate towards it and so into the abdominal cavity. In reality this danger is not of much consequence. The vagina of a healthy mare is not the site of pathogenic micro-organisms. My examinations made on twenty-four cases showed no traces of staphylococci or streptococci culture. What was grown were generally saprophytes.

Bacterial flora were far more prevalent in the vestibule than in the depths of the vagina. Only in four cases was material from the vestibule sterile, whilst in only three cases did secretion from the external orifice of the uterus contain bacteria.

It was interesting to note that on two occasions a streptothrix-like organism similar to the actinomyces thermophilus (Gilbert) was found. It grew luxuriously on agar and bouillon. The bacteriological examination supported the clinical evidence. So far I have operated on twenty-one mares without mishap or fatalities. After two weeks they were put to work.

Practical success was not as good as the surgical success. Of twenty-one castrated mares thirteen became quiet and useful animals, and were no longer a source of danger. The percentage of mares made valuable from a previous condition of uselessness is very encouraging.—*Swiss Journal of Veterinary Medicine.*

G.M.

Abstract.

RESEARCHES UPON CONTAGIOUS ABORTION OF CATTLE.*

By W. L. WILLIAMS, Department of Obstetrics and of Research upon the Diseases of Breeding Cattle.

IN 1910 the writer made some extended observations upon the killing floors of abattoirs regarding the prevalence and significance of the granular venereal disease, or infectious vaginitis, of cattle, some of the results of which were included in Bulletin No. 106 of the United States Department of Agriculture, published September 12, 1914. We have issued other publications from time to time relating to this affection and to abortion, which have been largely summarized in the annual report of the New York State Veterinary College at Cornell University for 1913-1914. In the present report we desire to avoid any material repetition of what has already been stated in these publications, and shall, where occasion suggests, refer to the above publications as a basis for general statements.

Abattoir Studies.

Our abattoir studies upon the granular venereal disease during the year covered by this report have not affected the question of its possible relation to abortion. The evidence remains purely clinical and circumstantial, consisting essentially of the conviction in the minds of many clinicians that, wherever the granular venereal disease is very intense, abortion, sterility, etc., are very common, and vice versa. Beyond this the evidence has not yet gone. During the year, however, our researches have added some very interesting data with relation to the granular venereal disease. It has heretofore been claimed that the disease is chiefly one of cows and heifers, but that it may invade the genital organs of the bull. One or two observers have further stated that the infection has been contracted by pregnant sows, and in these has caused abortion. Such observations have been presented as evidence of the importance of this infection in relation to abortion in cattle. Observations upon the granular venereal

* In co-operation with the Bureau of Animal Industry, United States Department of Agriculture.

disease have been very inaccurate. There has been a very marked tendency among observers to look for the granular venereal disease when a storm of abortion appears. When they do so, they find it, and at once conclude that it is the cause of abortion. At the same time they fail to make a diligent search for the infection in other animals in which abortion is not observed. If they did look for it they could find it.

During the year we have taken occasion to study this question somewhat extensively in abattoirs, upon animals coming from various sections of the country. Large numbers were examined, though not so many as in our Bulletin No. 106. We concentrated our studies in this respect chiefly upon bovine males and upon both sexes of sheep and swine. We were greatly interested to observe that the infection is just as universal in bulls as in cows and heifers and that bullocks or steers are quite as universally infected as either of the preceding. Our researches emphasize very strongly the fact that bovine animals of both sexes and those which are unsexed by castration are all alike involved, and while there are now and then individuals which do not show unmistakable lesions of the infection, it is nevertheless essentially universal from the time that the calf reaches the age of three to six months until old age.

Quite as interesting as these observations were the revelations obtained by examining the genital organs of both sexes of sheep and swine. Here again the lesions are just as marked and characteristic and well nigh as universal as in cattle. Lambs of both sexes, pigs of both sexes, and castrated as well as entire adults, all show alike the characteristic lesions of this infection. As in cattle, so in sheep and swine, there are individuals in which the lesions cannot be detected. In the very young animals of both sexes the lesions are quite generally not visible to the naked eye, but it requires only a few months until a very large percentage of the young animals of both sexes show the disease, and the frequency or universality of the disease increases constantly with the age of the animal, though after adult age has been reached the intensity tends to decrease.

The nodules, or granules, appearing in the genital organs of sheep and swine are identical in macroscopical appearance with those present in cattle. In male cattle, sheep and swine, the nodules, or granules, are seen chiefly in the sheath and prepuce

and upon the glans penis, so that the location corresponds very closely with the appearance of these lesions in the vulvar and vaginal mucosæ in the female. There is, however, this essential and interesting difference. We have failed to find any reference by anatomists or embryologists to the peculiarities of the prepuce in cattle, sheep and swine. The preputial sac does not exist in the newborn. At the time of birth the prepuce is closely adherent to the glans penis and the urethra opens into the sheath. The newborn male calf, lamb, or pig cannot therefore protrude the penis, and constantly urinates within the sheath. When puberty arrives, the adhesions between the glans penis and the prepuce become gradually broken down and the animal is enabled to protrude the penis. If the newborn male of either of these species is castrated, the development of the preputial sac is arrested, and as a consequence the animal may never be able to protrude the penis from the sheath, but urinates constantly within that passage. If the animal is not castrated until puberty has arrived or is near, the preputial sac becomes established in varying degrees, so that upon the killing floor one can find every gradation in the formation of the preputial sac. As a result of this peculiarity in the embryology of the males of these species, we have a different group of pathologic conditions prevailing. We have a more delicate membrane covering the glans penis and lining the prepuce than in some other animals, and these subject the animal to greater danger from various infections. The inability of the male which has been castrated early to protrude the penis, causing him to urinate constantly within the sheath, tends also to bring about certain types of disease, as the acute infection of the sheath in bullocks, which we do not observe in bulls nor in entire male animals of other species.

The fact that the granular venereal disease is far more universal and involves more species of animals than we have heretofore supposed does not affect the question of its importance in relation to the infection of cattle abortion and the group of phenomena associated therewith. The frequency or rarity of a disease does not fix its danger to the life or efficiency of the affected animal. There are rare infections which are very serious and there are common infections which are of little consequence, and vice versa.

Each of the two infections, the bacillus abortus of Bang and the granular venereal disease, if they are distinct infections, is so universally distributed and involves so nearly all cattle that it is impossible at present to show clearly what influence the one infection may or does exert upon the animal body in the absence of the other.

Another fundamental difficulty with successful research regarding cattle abortion is that we have no clear and reliable method for determining that an animal is free from the infection. Any animal selected for experimentation with either of these infections needs be accepted with the important reservation that it may already be infected.

Until these difficulties are overcome, researches regarding abortion need be pursued in conformity with such evidence as now exists. At present the evidence is so strong that abortion in cattle is due to the *Bacillus abortus* that most investigators regard it as proven.

Studies Upon the Small Group of Cattle in Immediate Charge of this Department.

Perhaps the most interesting development in the experimental herd in our department is the influence of the preparation of the milk upon the health of the newborn calf and the tendency of its blood to react to the agglutination and complement-fixation tests.

It is aimed to bathe the cows thoroughly a few days prior to parturition, to watch them constantly day and night and catch the calf upon an antiseptic sheet as it emerges from the vulva of the mother. The calf is then washed antiseptically and dried, placed in an isolated stall, and fed upon milk cooked in a water bath for about thirty minutes. Calves so grown show a marked contrast to those reared in the ordinary manner upon raw milk. In calves reared upon raw milk there appear in almost every one, from the thirtieth to the hundredth day, traces of the granular venereal disease in the vulvæ of the heifers and in the sheaths of the bulls. There appear also upon the tuft of hairs at the inferior commissure of the vulva and upon the preputial tuft of the male a black stain and black crusts of muco-pus. This staining of the tuft of hairs about the external genital openings has generally been attributed to urinary sediment or to soiling by feces or dirty bedding with which the parts come in contact in.

the stable. Our researches show very definitely, however, that this view is incorrect, and that the staining and matting of hairs and their becoming crusted over with muco-pus are due to a pathological discharge from the genital sheath. So far as we are able to observe, we must admit that in raw milk there is an element of infection which produces definite clinical symptoms in the calf which is fed upon it.

Taken in conjunction with the work of Schroeder and Cotton, who have shown that the Bang abortion bacillus exists in the milk of so large a proportion of cows, that it casts a cloud of doubt upon the milk of all cows, our researches in the feeding of calves become of very great interest. We do not know just what infection causes the discharge of muco-pus from the genital sheath of a calf fed upon raw milk. It seems highly probable that the muco-purulent discharge is caused by the organism which causes the granular venereal disease. What that organism is, we do not know.

An interesting observation is that in calves fed upon raw milk and which show the staining and matting of the sexual hairs the blood of a very large proportion thereof reacts to the complement-fixation and agglutination tests for the infection of contagious abortion. In the calves of our own herd which we have fed upon boiled milk and in which the sexual hairs have not become stained or matted, we have as yet failed to get a definite reaction by the serological tests for the infection by the Bang organism. These observations are in general, but not constant, harmony with observations upon calves fed on boiled milk in other herds than our own. Some of these calves grown upon boiled milk have now been studied for nearly two years. One has been bred to a bull which had been grown upon raw milk and had a soiled preputial tuft, has conceived, the pregnancy has run a natural course, and yet there has been no definite and clear reaction to the serological test and no definite symptom of the presence of the infection of contagious abortion, in spite of the fact that she has habitually consorted with aborters.

The number of animals which have been available in this work is too small to afford a secure basis for general conclusions except in a few particulars.

1. The researches of Schroeder and Cotton and others render it clear that a large proportion of newborn calves are exposed

to the infection of contagious abortion through taking into the digestive tract with raw milk the bacillus *abortus*.

2. The granular venereal disease appears in the genital sheaths of calves at thirty to fifty days, when fed upon raw milk, and the sexual hairs concurrently become stained brown or black and matted together with muco-pus.

3. The blood of these calves largely reacts to the serologic tests from the twentieth to the sixtieth day, receding for a time when the calf is placed largely upon herbaceous food.

4. Calves grown exclusively upon boiled milk generally retain clean sexual hairs, do not develop the granular venereal disease markedly, and their blood fails to respond to the serologic tests for contagious abortion.

5. So far as our very brief researches go, the negative phase of abortion appears to persist indefinitely in calves grown upon boiled milk under ordinary, natural exposure to the infection.

The only logical explanation for these differences, as we view the problem, is that the raw milk of cows contains an infection which is taken up from the alimentary tract, is carried through the blood stream to the genital tract of both male and female, and brings about certain lesions there which have not yet been carefully studied.

In prior publications we have held that the *Bacillus abortus* does not reach the cavity of the pregnant uterus (utero-chorionic space) through the blood stream, but invades that cavity through the vagina and the cervical canal of the uterus. The belief was also expressed that the bacillus recognized frequently in the fetus and its membranes entered through the chorion from the utero-chorionic space, invading in their order the fetal fluids (allantoic and amniotic), the fetal digestive tract, and finally the fetal blood.

While this view still appears to us correct, in so far as the pregnant animal is concerned, it seems quite clear that some as yet unidentified pathogenic organism, ingested with the milk of the mother, is borne from the alimentary tract, by the blood stream, directly to the genitalia, acquires a habitat in the genital tube, and contemporaneously therewith the blood of the calf tends to react to the serologic tests for abortion infection.

Many interesting data have reached us relating to the influence of the bull in transmitting a disastrously virulent strain of the abortion infection. Thus in one case three breeders assem-

bled eight virgin heifers and sent them to a highly prized bull for first breeding. None of them conceived. They were then returned to their respective owners and were bred to the respective herd sires of known fertility. After several months none of the eight had conceived. In another instance the owners of a fashionable herd bought three highly bred young bulls which had not been used, as outcrosses for valuable virgin heifers. Two heifers bred to one of the bulls conceived, and all others failed. The herd bulls of known fertility were then used, but eight heifers had to be discarded on account of persistent sterility. The data are incomplete. We are dependent for data of such character upon breeders of pedigreed cattle. When one follows his inquiries in such cases a short distance, the breeder becomes mute. In other cases it is related to us that in herds with two or more bulls, all, or nearly all, the cows served by one bull had aborted, calved prematurely or had retained afterbirth. But definite data which could be carefully analyzed were wanting.

On the whole, it would seem, from our observations, that considering as identical sterility, abortion, and metritis with retained afterbirth, until we have much clearer and more voluminous data upon the subject, we should consider the bull as an important element in the distribution of the disease.

Clinical Observations in Pedigreed Breeding Herds.

Our clinical observations during the year have proven of very great research value. They have been essentially confined to pure bred, registered cattle in large herds and of high value. The work has been carried out chiefly in consultation with local veterinarians and directed primarily to the alleviation of sterility, which has been handled essentially as an integral part of contagious abortion. This work has afforded unusual opportunities for the clinical examination of the genital organs, along with a complete clinical history of the patient. When incurable, the genital organs have generally been procured at time of slaughter and added to our already very extensive collection.

The curable cases fall largely into three great groups:—

(a) Intra-uterine infection, chronic endometritis, acute endometritis, pyometra, hydrometra, etc., in which, so far as we have been able to determine, the infection of contagious abortion

plays the chief initial role, complicated later by a complex infection.

(b) Intra-uterine infection insufficient to prevent conception, but leading to the early death and expulsion of the embryo or fetus, indicated by apparent conception followed in two to four months by return of estrum, the embryonic abortion usually escaping observation.

(c) Diseases of the ovaries, especially cystic degeneration of the corpora lutea, associated frequently with nymphomania and almost always with chronic endometritis, the uterus becoming much enlarged, atonic and flaccid. We have not been able to dissociate these from contagious abortion.

By dislodging the diseased corpora lutea from the ovaries and disinfecting repeatedly the uterine cavity, and especially the cervical canal, the work has been quite generally followed by satisfactory results. Cows long sterile or suffering repeatedly from early abortions conceive in a large proportion of cases. When such animals finally conceive without surgical interference, the pregnancy is usually insecure, and frequently ends in abortion. When conception follows through uterine disinfection, the pregnancy is usually secure, there is rarely abortion, premature birth, or retained afterbirth. This has led to an extension of the therapeutics in some herds to the disinfection of the uterus as a rule of practice following abortion, premature birth and metritis, with or without retained afterbirth. Involving a large number of animals, the work has afforded many data of value, and has, in a general way, substantiated views already expressed that the chief safeguard, the only available one, against this group of disasters is to see that conception occurs in a clean uterine cavity, and to rest content then that pregnancy and parturition will be normal and the calf will be vigorous, regardless of any and every form of exposure to the contagion to which the pregnant animal may be naturally subjected.

SUMMARY.

No disease of animals has been more unfortunately mis-named. One of the most complex infections in domestic animals, it has received a name emphasizing one symptom, and that one not the most important. Its presence, extent and importance are measured by abortion, as if that were a greater calamity than incur-

able sterility or death from retained afterbirth. Writers upon human pathology state that the venereal diseases constitute an important cause of abortion in woman, but the prevalence or importance of the venereal diseases in a community is not gauged by the number of abortions they cause, and no effort is made to control the diseases by isolating the aborting woman and disregarding all other individuals infected.

With equal persistence this disease has been handled as one involving the cow only, and even then restricted to the period of pregnancy and a few weeks following its termination. Evidence contradicts emphatically this view. Young calves, male and female alike, may frequently, if not generally, become severely infected, and there is evidence that the infection persists. At times it appears dormant, but its continued existence cannot well be doubted, not to say proven. Herd A has always had abortion, and it is just as rampant to-day as it has been in thirty years. The animals do not recover. Some are habitually resistant. One animal had a clean breeding record, and had been followed by the serologic tests for three years without a trace of reaction. She has not "recovered," so far as can be determined, but just resisted the infection all about her.

We have asserted repeatedly that because of this persistence of the infection we cannot hope, in the present state of our knowledge, for successful vaccination or immunization. If the disease itself induces no material immunity, if it is indefinitely persistent, our present plans for inducing immunity need be amended before we succeed.

Owing primarily to the misnaming of the disease, its handling has been enormously hindered or made fruitless by the general idea that the existence of the disease is restricted to a few herds, and that many herds are free from it. A careful study of the evidence presented should tend to cause some to believe otherwise. A breeder or dairyman waits till the disease is "introduced" into his herd before he is willing to take any definite measures to control his losses, and when a storm breaks he is in a great panic and demands an immediate, cheap and sure cure for a condition he has been creating for years. He is astonished to find that all "cures" fail in a storm. His pregnant females may abort, or they may not. He may give them

anything or nothing, he will know how many are to abort when the last pregnancy has terminated.

We believe it now sufficiently demonstrated that the disease is primarily and chiefly spread through the raw milk fed to young calves, and in a less measure and with less clearness that the bull is a highly important factor in the spread of the infection. Still more important, according to our observations, is the copulatory act, whether the bull is infected or not. It is a law of all animal life that intense activity of an organ or system accelerates any infection or disease therein, and this is no more true of any system of organs than those of reproduction. Our observations in our little experiment herd go far to show that ordinary exposure to the infection in stable, paddock or field is of scant consequence, and that we must concentrate our attention upon the milk fed to the newborn and upon copulation.

The milk is contaminated in two ways. Schroeder and Cotton and others have established the existence of the bacillus in the milk within the udder. A greater source of supply, perhaps the original source of infection within the udder, is the discharges from the uterus oozing down along the tail, thighs and udder, so that the calf cannot suck without taking into its mouth in abundant measure any infection emanating from the vulva. The importance of this is strongly supported by the data, where the calves ingested the bacteria existing in the milk, but were protected in large measure against the bacteria on the surface of the udder by increased cleanliness. The infection of the newborn calf is generally rendered all the more certain by the use of mixed milk after the first few days.

Technically, the one safe way to avoid the infection is to procure a sound calf and rear it in isolation on sterile milk. But far from all newborn calves are sound, and many of them will not withstand boiled milk during the first few days. Some of these will die on any food. Others apparently will live on raw, but not on sterilized, milk. The infection in these may be minimized by restricting them for a few days to the cleanest milk available.

The increase of abortion is generally deplored. Yet dairymen and breeders feed milk indifferently from any cow to all calves, or, worse yet, take milk from a diseased cow, which would justly be excluded from a market, and feed it raw to the calves, or, not having a sufficiently virulent abortion in their own herds,

they go to a creamery or cheese factory and buy raw skimmed milk or whey saturated with the most virulent infection, feed it to their calves, and then wonder why, when they are grown, they abort in their first pregnancy. Why should they not abort?

RECOMMENDATIONS.

While our knowledge of contagious abortion is meagre and fragmentary, we feel that the evidence now at hand is sufficient to warrant definite recommendations for its control. Further study must amplify these and render them more applicable and of greater efficiency, but we now possess sufficient data to outline definite measures:—

(a) Bathe the pregnant cow thoroughly a few days prior to calving, place her in a clean, disinfected box stall, douche the vagina and disinfect the tail, thighs and udder daily until she calves.

(b) Remove the newborn calf immediately at birth to a clean, isolated stall. If to be placed on its dam, disinfect her vagina, tail, thighs and udder each time before permitting the calf to suck. If to be fed (which we prefer), handle the cow in the same manner, have the milker disinfect his hands, discard the first few streams of milk, and draw the milk in a freshly sterilized vessel.

(As soon as the problem can be worked out more satisfactorily, we would advise boiling the milk from the first.)

(c) When the calf is five to ten days old, it may be placed upon boiled milk.

(d) When three to six months old, sound calves may be placed in small groups for economic handling.

(e) When of breeding age, breed preferably to a bull grown under preceding conditions. Douche the vagina of heifer and sheath of bull before breeding and repeat douche to bull immediately after breeding.

(f) When cows abort or, calving, have metritis, with or without retained afterbirth, control the disease and disinfect the uterine cavity as promptly as possible, and, this accomplished, breed.

(g) When sterility occurs, examine the internal genital organs *per vaginam et rectum* and apply such measures as the findings indicate.

The last two recommendations are technical and fall exclusively within the province of the trained veterinarian.—*Report of New York State Veterinary College.*

Correspondence.

PARACENTESIS ABDOMINIS.

To the Editor of THE VETERINARY JOURNAL.

IF I am quite in order in doing so, can you give me space in your next issue for a few remarks on the paper on the above subject by Mr. Bond, in your September number?

In the beginning (as is written in the good old book) Mr. Bond tells us the operation is not so common as it ought to be. That may be correct down South, but here it is entirely inaccurate, and practitioners in this part think as little of it as they do of giving a dose of physic, but do not go to sleep over the matter, and I cannot imagine anything so careless as to allow an animal to knock about the box for hours with a canula in position, as I have seen several cases where the bowel was torn by the patient throwing himself down during the operation, and the fixing of a string round the abdomen is about the limit, as every movement of the animal would alter the strain on one or both ends of the string and cause the inserted portion of the canula to rock all over the place, and surely the danger of this is evident to all.

Further does Mr. Bond conclude that it is good practice to leave the canula in position when the gas has ceased to escape. Is it not more than likely that the atmosphere of the place might enter the bowel, and possibly do some harm, as here, at least, stable air does not consist largely of ozone?

We puncture on either side, and just as often as necessary, an abscess may follow a dirty instrument, but we prefer not to allow this to grow as large as a cocoanut—and get ripe—we prefer opening it very much earlier with, I think, better results to the patient first, and all others concerned. My chief reason, however, for troubling you is to ask Mr. Bond if he will kindly explain how he concludes that the two mares which he did not treat would have made an uneventful recovery if he had been there earlier to tap them. Let me say at once that I hold no brief for the farrier with the forty years' experience, but in common honesty to him I expect Mr. Bond to tell us shortly how puncturing the bowel in either of those cases, would undo a twist. Up till now I have always thought a twist on any part of the bowel was fatal, and in quite a long experience have never seen

an animal with a twist recover. Have seen hundreds die from twist that had been punctured repeatedly, and as many die from the same cause which had never been punctured, as from the beginning of their illness till the end there never was the slightest need for the operation, and in the majority of cases of twist here, at least, the twist is present from the first, often even before any signs of abdominal pain are evident.

And in conclusion may I ask what this colic drink, as it is called, is meant for. Surely Mr. Bond will not even suggest that any young practitioner for whose benefit he is writing will be empirical enough at this date to give two such mixtures to any animal, and calmly think that two will suffice. The majority of up-to-date practitioners ignore the colic drink idea. They look at their patient and try to learn the cause of the combination of symptoms vulgarly called colic, and with the symptoms and history of the case do their little best to find a cause and treat accordingly, and the statement that two will suffice looks very much like what one sees on the cure-alls sold at so much per dozen by the eloquent vendor of quack medicines at our various cattle shows. Is Mr. Bond treating the disease or a symptom? What effect would his colic drink have on a case of impaction of the stomach or bowels, and would it not be more likely to be prejudicial than otherwise. Like Mr. Bond, I have the interest of the younger men at heart, and hope to have the pleasure of a very interesting explanatory reply in your next.

Glasgow.

OLD PRACTITIONER.

MELBOURNE UNIVERSITY APPLICATION.

To the Editor of THE VETERINARY JOURNAL.

YOUR editorial upon the Melbourne University Application in the September number of the JOURNAL was particularly interesting to me. While the editorial as a whole deals with an essentially British problem that does not concern a foreigner, one paragraph referring to American qualifications can with propriety be discussed by one "without the realm."

You say it is "an anomaly that a British graduate going to act as a veterinary surgeon in America has to sit before an American board before he is given a licence to practise." Why is it an anomaly that a British graduate should be required to take the same examination that an American graduate does? We do

not admit that British training, excellent as it may be, puts the M.R.C.V.S. in a "holier than thou" class, and above the restrictions that experience has demonstrated as necessary to protect the public and practitioners in America. With a few exceptions all States in the American Union have veterinary examining boards, and all graduates, native or foreign, must pass their examinations before they are licensed to practise. There is no discrimination, and it seems to me that this plan is fair and just. Our former simple faith that all was wisdom and goodness that came across the Atlantic with a college degree has received several severe jolts.

I have visited all of the American veterinary schools but one, and also a number of the leading European schools. In equipment most of the American schools compare favourably with the continental schools, and, I believe, are better equipped than are the British schools.

I am not claiming that our standard of knowledge is higher, as hinted in your editorial. The thorough training in the continental veterinary schools, particularly along scientific lines, is unquestioned, but in the practical application of veterinary science and art, at least to American conditions, we yield the palm to no one.

At present there are some American veterinary schools that require an equivalent of one year in an American academic course, or a certificate of graduation from a registered gymnasium in Germany, Austria and Russia, or a Bachelor's degree from France and Spain for entrance to the four years' veterinary course. All veterinary schools recognized by the American Veterinary Medical Association require one year of high school for entrance to the veterinary college, and all now require a four years' course.

Science and learning are not confined to any land or any race. Each country naturally develops its education more in certain lines that experience has proven most useful to it. Let us not boast of our superior learning, but let us give everyone a "square deal," no matter what his race or school, and if in the great game of "making good" he can beat us, we shall not begrudge him the prize.

NELSON S. MAYO, M.S., D.V.S.

Chicago, Ill., U.S.A.



CAPTAIN EDWARD SEWELL, M.R.C.V.S., A.V.C.
Awarded the Military Cross for bravery and devotion to duty
under shell fire.

THE
VETERINARY JOURNAL

Editor:

FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING;
MAJOR IN THE ARMY VETERINARY CORPS, AND FORMERLY PROFESSOR IN
THE ROYAL VETERINARY COLLEGE, LONDON.

DECEMBER, 1916.

CAPTAIN EDWARD SEWELL, M.C., A.V.C.

BORN in Ireland in 1889, Captain Sewell was educated at St. Andrew's College, Dublin, and entered the Royal (Dick's) Veterinary College, Edinburgh, in October, 1908, qualifying in 1913. Immediately after graduation he joined the Army Veterinary Corps, Special Reserve, and in 1914 was successful in obtaining an appointment under the Indian Civil Veterinary Department. This position, however, he never took up, as war broke out in August, as he was to have sailed for India in the following October. Mobilising with the Special Reserve, Captain Sewell joined the 40th Brigade R.F.A. at Bulford, and was sent with them to France in August, being present at Mons (where on one occasion he helped to pull the guns out of action under severe fire), Le Cateau, the battles of the Marne and the Aisne, and afterwards with his regiment at Ypres.

In March, 1915, he was selected to command No. 11 Mobile Veterinary Section, a position he still occupies, and was mentioned in General French's dispatches, being awarded the Military Cross in June, 1916, for devotion to duty in the work of his profession when attending wounded horses under shell fire on more than one occasion.

Editorial.**SAND COLIC.**

THE article on sand colic is one which will prove of considerable interest to those who are doing duty with the armies in the field, especially on the eastern side of the war zone. In France and Flanders, too, it is causal factor of much anxiety and many deaths, and the Army Veterinary Officers stationed in certain districts, both French and English, recognise it without difficulty. It is one of the most troublesome agents to get rid of from the intestine, owing to its weight and bulk, and horses have been known to die weeks after their removal from the sand area, a post-mortem examination revealing quantities to be still present in the large intestine.

There is no doubt that the three causes defined in the article are the principal ones, and if they could be overcome cases of sand colic would be few and far between; but the difficulties of always feeding in an hygienic manner under war conditions are so great as to be scarcely appreciated by those who have never seen them. Horses fed off the bare ground without troughs undoubtedly waste a considerable quantity of food, and in picking it up off a sandy soil very often unwittingly acquire a taste for sand, and will eat quite large mouthfuls voluntarily, even when no food is present. It is one of the disadvantages to be guarded against when choosing a site for horse lines, and one which should always be borne in mind.

F. H.

THE RIGHT WAY.

PROGRESS on the right way by the best methods leads us to the desirable and profitable goal. Endeavours to advance on the true road by wrong modes bring nothing but trouble, disappointment, muddle, and defeat. Great effort on improper lines is a profitless and useless expenditure of energy and brain sweat. A good start is half the battle, but we want to be able to perceive what constitutes the good start. Organisation, perceptiveness, and ability in any sphere of labour must be factors in producing the finest finished results. Ability exists in plenty among our countrymen, but it is questionable whether the vision that can see and call on this ability to act is prevalent to any great degree. At any rate a consideration of fitness for the job does not always, nor perhaps the most frequently constitute the prime factor in the choice of the

special worker. Nor does expert knowledge on any subject matter appear necessary to enable an ordained chief from giving judgments or opinions on the question.

The judgment or opinion may be all wrong or founded on absolutely incorrect premises, yet it may stand for generations, as a lighthouse (giving no light) or a supposed correct precedent.

We have seen innumerable instances in our history of men with metaphorical D.D. qualifications, busy in diagnosing and prescribing for pleuro-pneumonic states and conditions. The insidious and evil force called influence is perhaps most frequently responsible for the insertion of square pegs into round holes, and the giving of the right job to the wrong person. The shadows of the Great Pretender are reproduced here almost every day in miniature. If the effecting of true advance depends on the right man getting the job, it is equally true that the right man must be backed up with a sufficiency of means to enable him to execute the job well. Men cannot win a war without food and guns. Food and guns cannot be produced without labour and money. A good start and steady progress can never be made without adequate equipment. Those who supply as well and those who consume must have a good knowledge of the work in hand, and what it requires humanly and materially.

Apart from backing the wrong horse, we in this country have most frequently come to grief in not feeding and grooming the right horse sufficiently. Agriculture, commerce, and administration have been made the playthings of politics instead of being looked on as vital necessities of the nation—national and not party questions. In many cases the downfall of desirable movements has been brought about chiefly by poor fiscal methods and plans badly laid. Educational moves have frequently gone glaringly astray, but fiscal operations badly conducted have also much to answer for, and have produced quite as many shipwrecks.

A good impetus is necessary to carry any movement far, the getting up of the impetus is work for giants or slave-drivers. If you tell a poor man that if he does not work he must starve, he will probably work. He clings to life, but the driving force is not great. If you inform a house-owner that he will lose his house unless he defends it against some destroyer he will promptly take measures to preserve it. If you convince a man he will lose

his liberties and his country unless he makes cause against the enemy he will go whole-heartedly into the contest. The whole-hearted impetus must be carried into National affairs if we are to continue to exist and progress.

In our own profession we have frequently been ignored by the givers-out of jobs. We have often seen positions which we ought to have been asked to fill given to outsiders. We have witnessed many a time the right job being performed by the wrong man. Money and effort have been wasted and no wholesome lessons learnt. It is quite a pleasure therefore to read of an expedition in research being put in the hands of the right people. We are informed that a move is to be made into the investigation of joint-ill by a committee of scientists, medical men and well-known veterinary surgeons. We trust the veterinary surgeons will take a firm hold of their end of the stick and that the factors in any successful advance as indicated herein will be borne in mind. Scotland is the home of this movement, but then Scotland has frequently managed to point the right way and to travel in it.

G.M.

ON GOING SLOWLY.

WHEN one is whizzing along in an express train one catches only fleeting views of the landscape, when one travels by motor-car one sees more of it, when one drives in a vehicle one surveys more still, and when one walks it may be discerned best of all. If the countryside is dull and uninteresting, the sooner we are through it the better. If it is fascinating, grand, or picturesque, walking has its advantages over faster modes of progression. We can see more of the beauties of nature, we can examine them more closely, and, finally, make a more perfect study of them. So in intellectual and scientific fields going slow may lead to better exploration of the region travelled and sounder deductions from the problems studied. We suppose that at present few veterinary surgeons are busier than they were before the war. Those whose lot is not cast in close proximity to a military camp will be worse off than their more fortunate fellows. Slackness of work, however, need not cause us to give way to dark forebodings or to mourn unduly. The sunshine will come again. It is questionable whether when working at full speed, with few leisure moments on hand, we do ourselves or our profession the

greatest amount of good. In present circumstances we can be philosophers, and spend our time in studying the cases we have more closely, in thinking about them, and round them, and recording our experiences for the good of our fellows and the benefit of the profession. A time of going slow ought to be a time of healthy progress and production. Fast investigation and research are very often false and illusory. The soundest work is often of slowest growth.

The great Frenchman, Rousseau, wrote a passage which, translated, reads: "It is difficult to think nobly when one thinks only to get a livelihood." In leisure moments we can think nobly and profitably. In a well-ordered mind travelling slowly may lead to intellectual stimulus, and should not bring about degeneration, inertia, or decay. We need not be dull because we are not busy. It is better to read much, think frequently and write often, than be classed as a dullard or a mere self-seeker. We had rather make mistakes with Johnson, who, when asked by the old lady why he had described "pastern" as "the knee of a horse" in his dictionary, replied briefly, "Ignorance, madam; sheer ignorance," than be among the dull and unproductive people who are said to be very happy because "they neither write themselves nor are sensible of what other people write."

G. M.

Editorial Note.

WE ARE publishing in this number a short communication on the National Herb-Growing Association. The revival of systematic collection, cultivation, and marketing of medicinal and sweet herbs as a rural industry is an object that should appeal to us. Prior to the war this trade had been practically killed by German competition. We are indebted to E. L. Chamberlain, F.R.H.S., for the communication, and think it will interest our readers.

Original Communications.

THE VALUE OF THE INTRA-DERMO PALPEBRAL METHOD OF MALLEINISATION.

By FREDERICK HOBDAY, F.R.C.V.S., Honorary Veterinary Surgeon
to His Majesty the King; Major, Army Veterinary Corps.

IN JULY, 1915, by the courtesy of the French Army authorities, Professor Douville (*Vétérinaire Aide-Major*) demonstrated to Brigadier-General Moore (Director of Veterinary Services) and a group of English veterinary officers, the method of application of the intra-dermo palpebral use of mallein as employed throughout the French Army. A note of this was published in the VETERINARY JOURNAL at the time (VETERINARY JOURNAL, August, 1915), and the Director of Veterinary Services was so favourably impressed that this method of testing was given a thorough trial. The trial was so satisfactory that it has now become the universal test, in preference to all others, and considerably over two million doses have been used.

Its advantages over the subcutaneous cervical method are especially noticeable in times of war and where exceedingly large numbers of horses have to be speedily tested. In the first place, it is of great advantage to reduce bulk of material carried or sent about, and it is easy to see that 5,000 or 10,000 doses each of two minimis occupy less room and are of less weight than 5,000 or 10,000 doses each of 18 minimis.

Then, again, the result is much more readily seen, for it is only a matter of quite a few minutes to inspect 200 or 300 horses when one has only to glance at the eyes. Swelling in the region of the eyelids is so much more perceptible than swelling in the subcutaneous region of the neck.

Thirdly, the test itself is a more delicate one than the subcutaneous neck method, in that the reaction is more violent and more rapid. No temperature testing is necessary, and the saving of time and trouble in this respect is enormous.

Fourthly, the cost of a dose of the intra-dermo-palpebral mallein is about one-eighth of that of a dose of the neck mallein.

Fifthly, it is much easier of application, and can be done much more rapidly—a consideration when doing hundreds of horses daily.

After nearly eighteen months' personal experience on thousands of animals, the above points are verified, and the method is the one much preferred.

Briefly, for the benefit of readers who are even yet not familiar with the technique, I will again describe it, associating with it the names of Veterinaire-Major Lamarque (who was the pioneer of its use in the French Army), Professor Douville (of Lyons Veterinary School), and M. Victor Drouin (formerly Assistant in the Alfort Veterinary School, Paris).

The application is made by means of a small 1 c.c. syringe (Strauss-Colin pattern is one of the most convenient) with a supply of fine sharp needles.

The mallein used is of 1 in 4 concentration (malléine brute 1 part, 5 per cent. carbolic acid solution 3 parts), and is supplied in small tubes containing twenty doses, or more if asked for.

The usual sterilisation precautions as regards the syringe are adopted, the cost of the apparatus being only a few francs. In our case we use a mug or other vessel full of water kept boiling by the aid of a small spirit stove, the whole being conveniently protected from the wind by being carried in an ordinary stable bucket. I have never yet seen a case of septic infection of any sort, and this is all we have done in thousands of cases. The horses are drawn up in a row, and the operator commences at the bottom of the line facing the left eyes. He has previously arranged for the help of four, or even six, smart fellows with twitches, in order that he may not be kept waiting. Although it is quite possible to do a hundred horses without the use of a twitch, it is always better for one's own safety, when dealing with strange horses, as well as for rapidity and certainty of working, to have one's assistants thus equipped.

The twitches are applied preferably to the right ears, and the operator, having filled his syringe, commences to walk along from horse to horse, carefully and deliberately giving to each one two minimis intra-dermally in the under eyelid, about the centre, but slightly inclined to the inner canthus.

He proceeds from horse to horse, doing them at the rate of three or four a minute easily, his assistants with the twitches following on after one another as speedily as possible. If one has a troublesome horse, it is better to set it aside to be dealt with

at the end, when it can be removed from the company of the others, and is usually amenable.

The eyes are inspected in about twenty-four hours, and the horse can, if urgently necessary, be worked whilst the test is in operation. The subjects should be seen again about the thirty-sixth or forty-eighth hours before an absolutely definite decision is arrived at, although in the majority of instances twenty-four hours decide it. If seen within three or four hours, many horses show a slight swelling of the lid, but this is not the characteristic swelling of glanders.



Fig. 1.
Side view showing the reaction after injection into the lower lid of a glandered horse.



Fig. 2.
Front view of a "reactor." Note the muco-purulent discharge from the inner canthus.

These photographs have already appeared in the VETERINARY JOURNAL, 1915, and are published by the courtesy of Professor Douville. They are absolutely typical of what has been seen many times since the first article was published, and are republished owing to the restriction upon the use of the camera in the war area having prevented the taking of other photographs. F. H.

Should the animal be healthy, at the twenty-fourth, thirty-sixth, and forty-eighth hours there will be nothing abnormal observable and no swelling. On the other hand, should it be glandered, the eyelid at the first inspection has become very visibly swollen, the eye being closed or half closed, and a discharge of

mucus coming from the inner canthus. Generally both eyelids are swollen, and with a violent reaction the eyeball is completely hidden. The swelling is characteristic, closing up the orbit to a more or less degree, and being excessively tender. If the animal is kept alive, the swelling extends downwards over the supra-maxillary region, and there may be a cording of the lymphatics extending to the sub-maxillary gland, which is swollen and tender.

This swelling, which is readily distinguished from an ordinary œdema of the eyelid, persists in a glandered case for three or four days, and in the meantime, if there is any doubt about the case, confirmation can be obtained by the application of the test intra-dermally to the other eye. This should be done within forty-eight hours—the sooner the better—and the reaction here obtained will be equally good. If preferred, as a control test, instead of using the eye mallein, a confirmatory subcutaneous neck test may be made with the ordinary mallein supplied for this purpose. If this is done within forty-eight hours, a good reaction here will be obtained, although I have seen cases in which the neck reaction has not been sufficient upon which to give a positive diagnosis, whereas the eye reaction was positive, and the post-mortem examination has confirmed the presence of glanders lesions.

Finally, there is no question, in my opinion, as to which method is the best to use in dealing with large numbers of horses, such as is the case at the present time. The convenience of transport of the dosage, the convenience of administration when one has given a few doses, the great advantage of visibility for the subsequent inspections, and the more marked reaction to be obtained in the delicate tissues which surround the eye, and the fact that there is no need to take temperatures, give to the intra-dermo orbital method a superiority over any other method which has, up to the present, been brought before the profession.

THE EFFECT OF HEAT, BURNS, AND SCALDS IN THE HUMAN SUBJECT AND DOMESTICATED ANIMALS.

By FRED. C. MAHON, M.R.C.V.S.

THESE conditions in human practice are fairly common, but in the province of the veterinary uncommon. We chiefly find such affecting the domestic pets, as dogs, and cats, in whom,

too, the hairy covering affords some slight protection as compared with the human, whose protection through clothing under civilised conditions resembles that of these animals.

I have chosen the subject because I have occasionally encountered some severe cases in the dog and cat, not only from boiling water being accidentally spilled over them, but such agents as lime, hot oil, tar, carbolic acid, turpentine, etc.

Human Subject: Division.—The most useful division for practical purposes is that which has long existed—viz., first, burns producing mere redness; second, those causing vesication; third, those causing death of the part.

1. The first class is followed in the human patient by superficial inflammation, terminating in resolution, with or without desquamation of the cuticle, the pain resembling that of the original sense of burning.

2. In the second class there is a higher degree of inflammation, causing the cutis to exude serum, and form vesicles. These in trivial cases dry up and heal, but if the injury to the cutis has been sufficient to cause it to suppurate, they will be succeeded by ulcers.

3. The third class of burns is attended with mortification from disorganisation of structure. They are, for obvious reasons, not attended with so much pain as the second class, but in every other respect they are infinitely more serious, and the sores which remain after the separation of the sloughs are often months, or years, in healing.

Constitutional Symptoms.—The constitutional symptoms of very severe burns are those of great collapse. The surface of the skin in human subject is pale, the extremities cold, the pulse quick and feeble. There are violent and repeated shiverings, and the patient often complains most urgently of cold. In some fatal cases these symptoms are soon succeeded by laborious breathing, suppression of secretions, coma, and death. In others dissolution is preceded by a period of imperfect reaction, with delirium, and a sharp, jerking pulse.

Prognosis.—Extensive burns, even of small severity, are always dangerous, and especially if vesication has occurred early, and the cuticle has been stripped off. Burns on the trunk are always more dangerous than those of an equal extent on the extremities.

With regard to the symptoms actually present it may be noticed that, although the severe pain, such as is common in burns of the second class, is in itself a source of great danger from its tendency to exhaust the vital powers; still it is, on the whole, a favourable sympathy if the injury is extensive. Apathy and stupor indicate urgent peril.

The periods of danger in burns are three: First, during the first five days from collapse, or imperfect reaction; second, during the sympathetic fever which follows, in which the patient may sink, with an affection of the head, chest, or abdomen; thirdly, during the suppurative stage, in which he may die from the profuse discharge or from debilitating diseases induced by it.

Kenlish observed that many cases prove fatal on the ninth day.

Morbid Anatomy.—A post-mortem examination readily accounts for the coma and laborious breathing, which are such constant symptoms of fatal burns. Congestion and serous effusion are found on the surface, and in the ventricles of the brain, and the air-cells of the lungs are loaded with a thin serous or muco-serous fluid.

It was shown by Mr. Gurlong [*Med. Chir. Trans.*, Vol. xxv.] that severe burns may be followed by an acute ulceration of the duodenum, liable to terminate fatally by perforating the intestine and causing peritonitis, or by opening some large artery and causing effusion of blood, part of which may be evacuated by vomiting and purging. Mr. Humphrey has also noticed ulceration of the lower part of the œsophagus. The bleeding usually comes quite suddenly and without warning.

In the causes of inflammation, Dr. Brown Sevard explains the ulceration of the duodenum which follows burns by injury to the peripheries of nerves, causing morbid changes, at a distance, by a kind of reflex action. This seems a very rational view in considering the case.

Treatment.—The treatment of burns in their early stage have been a matter of great dispute. Some eminent surgeons [*Earl's Lectures on Burns*, London, 1832] have advocated ice or other cooling application; others the use of turpentine and other stimulants. The latter plan of treatment was advocated by Mr. Kenlish, of Newcastle, at the beginning of the present century. The following, however, seem to be the principles of treatment

deducible from the conflicting theories and practices which have been proposed—viz., firstly, that the first application should be of a mildly stimulating nature. Secondly, that after the first two or three days they should be soothing, till, thirdly, slight astringents may be applied to expedite the healing; and fourthly, that the part should throughout be most carefully preserved from the atmospheric air, from cold, and from bad odour. If these principles are held in view, the surgeon will have no difficulty in finding appropriate remedies.

Constitutional Treatment.—Collapse must be met by brandy and beef tea. If there be much pain it should be controlled by opium.

Treatment of the remaining Ulcers.—The ulcers resulting from burns are often extremely intractable. The granulations are pale, flabby, and exuberant, they secrete pus profusely, and many months often elapse before they are healed. The cause of this disinclination is not very well understood, but there is one cause which may be easily remedied—viz., too full a diet, which is often needlessly used on the plea of supporting the strength. “There can be no doubt” that full diet and stimulants, during the suppurative stage, keep up irritation in the system, and cause the immense continued discharge by the exposed surfaces of the wound. (*Burns's Second Essay*, Newcastle, 1800, p. 64). And it is equally certain that many cases will rapidly get well when the diet is lowered and purgatives are administered. The binding down of the edges of the ulcer to the condensed tissue beneath is another cause of delay. If the ulcer is irritable and painful, or hot and swelled, or seems inclined to spread, or if small abscesses threaten to form under the skin, poultices or water-dressing sedatives and aperients should be resorted to. If sloughs are tardy in separating they must be treated like the sloughing ulcers. When the irritable state is removed a succession of mild stimulants and astringents will be advisable, especially the zinc lotion, chalk, bismuth, or calamine ointment, simple lint, and pressure with strips of plaster. When the discharge is profuse the sore should be constantly kept thickly covered with very finely powdered chalk.

A very useful application in cases requiring gentle stimulation and complete occlusion of the air, is a mixture of equal parts of balsam of Peru and olive oil, brushed over the surface smoothly with a soft brush every morning and evening. It has the advantage of partly overcoming the foetid smell.

Treatment of the Cicatrix.—The cicatrix of very severe burns is very liable to become excessively hard, dense, and cartilaginous, and to contract in such a way as to occasion the most serious deformities.

Thus the eyelids or mouth may be rendered incapable of closing, the chin may be fixed to the breast, or a limb be rigidly or immovably bent. This constriction may be sometimes successfully opposed by keeping up extension with a splint, or if the neck be partly burnt, by making the patient wear a stiff collar, and by frequently moving the part during cicatrization, and the cicatrix may be lubricated with oil.

If the fingers are severely burnt, lint should be interposed between them, and they should be kept apart as much as possible; although it will be very difficult to prevent them adhering together.

When any of the orifices of the body are involved, they should be kept dilated with cannulae or plugs of oiled lint.

But if, notwithstanding every precaution, the cicatrix contracts, and produces deformity, or prevents any necessary motion, the knife should be resorted to. Sometimes the whole cicatrix may be extirpated, the wound being treated by water-dressing, and the parts kept in a proper position during the cure.

Now, as veterinarians, our patients do not admit of quietude, as, for example, in cases occurring in canine and feline practice. In the horse we find docile patients at times, lastly, but patiently quiet, comes the bovine. In the latter, save by malicious use of caustics or vesicants, we rarely encounter conditions requiring treatment. I have, however, had a few in my experience—e.g., those due to acids: sulphuric, nitric, and hydrochloric; caustics: metallic salts, silver nitrate, butter of antimony. These agents are used by quacks, and the ignorant very often, and cause great destruction of animal tissues.

In the dog and cat, burns from live coal, dropping by accident of boiling water, the too frequent use of lotions and liniments

with turpentine, mercurial preparations in skin diseases, ammonium chloride of mercury have come under my notice at various times.

Water nearly boiling is a prompt and powerful counter-irritant, especially in cattle practice. I saw two very bad cases in 1884, at Bridgewater, when studying "Cattle Practice" with the late Edwin Ware, M.R.C.V.S., of that town, and where the skin was severely injured, with grave local and constitutional results.

In our patients formerly carron oil was the remedy for most burns and scalds (lime water with linseed or olive oil—*à partes*).

In modern days various new remedies have been used in burns and scalds such as collodion, antiphlogistine.

Thermofuge, this latter agent, has proved a boon to me for some time past, as an antiseptic, emollient, and derivative.

It is an efficient substitute for poultices, compresses, or fomentations, and the application obviates the continuous attention needed, and formerly given to patients, both human and animal. Huxley's antiseptic plasma dressing I have also used in practice with good results.

Chloretone, or boro-chloretone, is also used; it induces active reparative processes, aids absorption of exudation, or induration, and above all relieves pain.

Lastly, grafting, as practised in human practice, has not apparently found vogue with us, as I cannot find any references to the same in veterinary literature, but it may have been employed by some, and recorded, and escaped observation for the moment.

In the *Medico Chirurgical Translations*, Vol. XLVI., p. 149, there is an interesting case recorded of such being done extensively by a Mr. Wood of King's College Hospital, and numerous cases are in record in modern works (Human), and current literature—e.g., *Medical Times Lancet*. Should be pleased to know if any of our leading canine and feline surgeon specialists have performed the operation of late years, and with what results. I know quite well the difficulties in our patients are two-fold compared with that of the human surgeon.

As burns and scalds produce grave shock, I am in the habit of using pituitrin and adrenalin.

I use Burroughs, Wellcome and Co's Vaporole "Infundin," Pituitary (Infundibular Extract 0.5 c.c. and 1 c.c.), both intra-

muscularly and per rectum, as occasion demands. The subject here treated is a very interesting one, and its rarity compared with the many diverse complaints of our patients "is my apology for the Resume," which I trust may be of some interest, at all events, to many in the profession, and prove instructive, if not useful. I have penned these lines in a few leisure hours, feeling that I am filling a gap in veterinary periodicals, although prevented by age from doing my share in the arena of warfare. I work and travel on and learn "to labour and to wait," and strive to leave behind me "footprints in the sands of time."

EXPERIENCES OF A VETERINARY OFFICER AT THE FRONT.

DURING one of the recent bombardments I was ordered to a village under shell fire to attend some horses, and afterwards went on to where they were cleaning up the scene of a recent fight. The dead bodies of both English and Germans were lying about everywhere, and the piles of rifles and equipment were being collected by the Salvage Corps. The place was still being shelled, and the stretcher-bearers were bringing in the wounded. At nightfall I returned to the village where my billet was. About 10.45 the Germans started shelling us, and we all made for the cellars.

One of my brother officers, a very popular man in the regiment, collected four of his men, and was placing them in a cellar just opposite Headquarters, where I happened to be. I saw him order his men to descend the cellar steps, and he himself prepared to follow, when suddenly a shell descended full in the entrance and killed the whole lot. He was one of the best of fellows, and his death in my presence was a great shock to me. I myself did not go to a cellar, but went to my Aylwyn Hut, where I sat on the edge of the bed and chatted with two other veterinary officers, who, stationed close by, had come into the village on business, and were unable to return on account of the whole of the road being heavily shelled.

Suddenly a shell burst within thirty yards of the hut, and killed twelve horses outright, a fragment coming right through

the roof. The concussion knocked the three of us down to the ground, but did not make us unconscious, although we were dazed for a time.

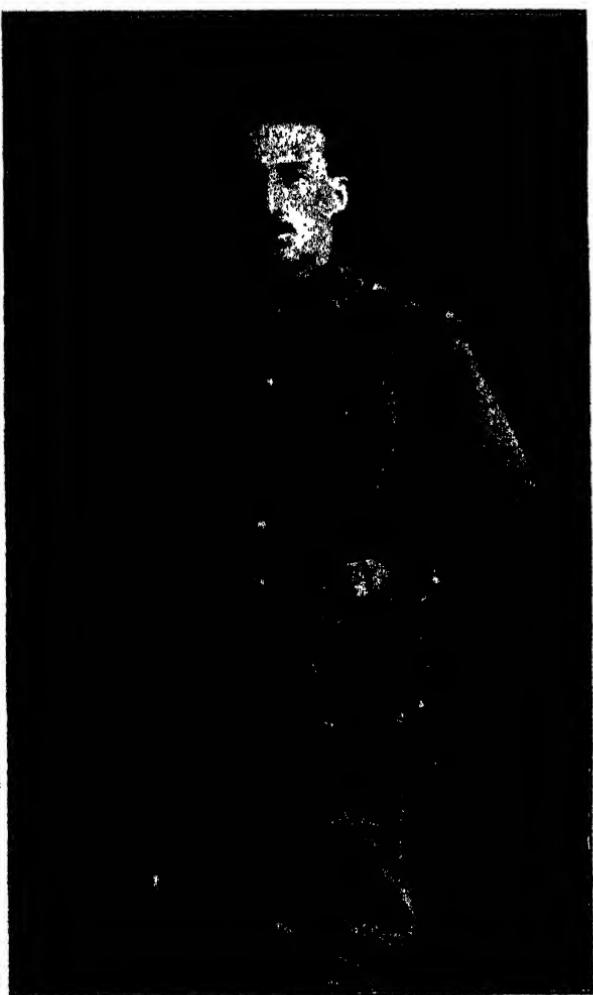
One of my comrades wanted to go out of the hut, but I persuaded him that to go out into the darkness would be madness, especially to attempt to travel along the road, and eventually we all sat and waited until daylight. The three of us suffered very much from shell shock, and were for a time involuntarily trembling, our nerves being greatly upset.

The next morning the Headquarters of the Division moved on to another position, but I was left behind with the Mobile Veterinary Section, remaining there for about a fortnight.

As I had no special cellar allotted to me I went to the Medical Officer, who had a dressing station in a dug-out on the opposite side of the road, and he persuaded me to lie down in a corner of his place. Wounded men were being brought in constantly, and I laid down on a stretcher that night amongst the dead and dying. The heat and the smell were stifling, and I could not sleep, still being overcome by the effects of shell shock and the terrible sight which I had witnessed, and which had involved the loss of my dear friend. Presently a padre entered with a lantern and administered comforts and refreshments to the wounded, taking the last requests of the dying. When he came near my stretcher, the blankets being right over my head, he said, "My dear fellow, what can I do for you?" I replied, "I want a drink." He gave me some brandy and water, and I laid down until morning, when I went on to another spot, about half a mile further away, on a hill. From here I had a splendid view of the bombardment both night and day, and a most wonderful and terrible sight it was.

I was there for over three weeks, until the division moved out of the trenches, when we all went further back out of the firing line for a rest. After three days we returned again to the trenches in another part of the line, and a short time afterwards I was relieved by an exchange of officers, and I myself went down to a veterinary hospital.

A.V.C.



JOHN VINCENT HOLLAND, M.R.C.V.S.,
LIEUTENANT, ARMY VETERINARY CORPS, WHO HAS BEEN
AWARDED THE VICTORIA CROSS.

Clinical Cases.

CYST OF THE EPIGLOTTIS IN A HORSE.

By FREDERICK HOBDAY, F.R.C.V.S., Major, Army Veterinary Corps.

THE unusual occurrence of a cyst in this region makes the case worth putting on record, especially as the symptoms produced were of an exceptionally severe and alarming character.

The patient, a cart horse, was evacuated to hospital, without any definite diagnosis.

The history given was that the animal would suddenly stop, stare around wildly, throw up its head, show difficulty in swallowing, followed by dyspnœa, and then fell over in a semi-conscious state. After lying on the ground for a few moments, it would rise, and apparently be all right. This occurred quite independently of feeding time, and generally upon walking out.

Stenosis of the œsophagus, or an œsophageal pouch, were each suspected, but exploration gave no confirmation, and upon examination of the back of the pharynx with a mouth speculum a cyst about the size of a tangerine orange attached by a fair pelicle, could distinctly be felt. This explained the whole thing, as the cyst was able to roll back across and into the laryngeal opening, and cause dyspnœa.

An ecraseur chain was passed over it (Captain Leese, A.V.C., being the operator), and the removal was easily effected. The result was a perfect success.

A LONG ILLNESS.

By J. H. PARKER, M.R.C.V.S., Faringdon.

ABOUT ten weeks ago I was called to see the shire stallion "Marden Hotspur," aged $3\frac{1}{2}$ years; and insured with the Yorkshire Company for £750. I found him to have an attack of laminitis, with a temperature of 106 deg. He seemed to quite recover in about two days. A fortnight later was asked to see him again, as he was not doing well. Found him to be losing condition, was sleepy, pulse 60, but regular, respirations normal. Temp. 103 deg. Knees and hocks swollen. Urine passed

in small quantities. Appetite fairly good. He kept more or less in this condition for about six weeks, but was gradually losing flesh and getting tucked up at the flanks. Every time I visited him I remarked that he was getting poorer. On giving an unfavourable report to the company, they sent their veterinary surgeon in consultation with me three times. The first two times he frankly admitted that he did not know what was the matter with the animal, but the third time he came he was convinced that he had got an internal abscess, and suggested streptococci and staphylococci injections. He was of the opinion the horse would recover. However, he did not improve, so I reported again. Then they sent a well-known specialist to see him, which he did about ten days before the horse died. By this time the horse had developed a jugular pulse and clear symptoms of heart disease. He diagnosed "Heart disease, slight pleurisy, and urinary trouble," and said "with proper treatment he ought to make a good recovery." His suggested treatment was adopted. The horse dropped dead on Monday morning, October 30th. A P.M. next day showed heart to be enlarged, soft and flabby. Well-marked vegetation on the ventricular valves, especially the mitral. Lobar pneumonia in the anterior lobe of the right lung about the size of a man's fist. This was consolidated and in a state of grey hepatisation, evidently of some standing. The rest of the lungs were quite healthy. The right kidney was much enlarged, and showed chronic inflammation, its substance being friable and rotten. This condition, I thought, might account for the scantiness of the urine passed for the last month. The attendants on the horse and myself were quite of the opinion he was going to die.

NEUROMA OF THE FIFTH PAIR OF CRANIAL NERVES (TRIGEMINAL). PARALYSIS OF THE MASSETER MUSCLES.

By R. HUDSON, F.R.C.V.S., Retford.

THE subject was a three-year-old pony about thirteen hands high. The pony had been at grass during the summer and not handled for two or three weeks. It was observed by its owner to be getting thin and inclined to mope about, so he brought it into the stable and attempted to feed it on various foods, but it

took very little. With the exception of an appearance of emptiness about the flanks the pony appeared in fairly good condition, pulse and temperature being normal. On passing my hand into his mouth I found he had lost all power to grip, the masseter muscles being paralysed. The under lip did not hang, showing the paralysis had not involved the muscles of the lips, nor were the buccinator muscles affected, for the animal was able to take up liquids. The lips and buccinator muscles are supplied by the seventh pair with motor filaments.

Diagnosis pointed to trouble of a central origin, involving the 5th pair of nerves, but, the animal being only three years old, I was doubtful as to tumours being the cause.

There was no evidence of injury. Treatment consisted of I.iq. Strychnia and Pot. Iodide given in gruel, and was carried on for a fortnight, when I advised the owner to have him destroyed.

The owner carried on for a fortnight afterwards, when one morning he found the pony dead. He sent me the head, and reported that he had improved very much in condition on gruels.

Examination of the brain revealed an enlargement on each trifacial nerve between the root and the wall of cranial cavity. The enlargements were of a fibrous nature, blending with the dura mater and nerve sheaths. On one side the growth was as large as a walnut, on the other a little less.

IMPERFORATE HYMEN.

By J. H. RIPLEY, M.R.C.V.S., Hurst Green, Sussex.

Subject.—Dark roan cross-bred heifer (mostly shorthorn), age about twenty months.

History.—I owned this heifer for about five months during the previous year, and, seeing her daily, can be sure of her being then in apparently perfect health.

Her subsequent owner had her served three times, and each time after coition some blood was discharged and continuous straining followed. These conditions became more marked after each service, and ever since the third service the straining was practically incessant.

Treatment.—On being called to attend the animal I examined her per vagina and per rectum. The rectal examination revealed a huge mass, the end of which was reached when the hand and arm were about one and a half or two feet inside the rectum.

The genital opening was small, and the mass was touched with some difficulty. A cannula was first guided into position and the trocar then introduced. When the heifer made her next straining effort the instrument was thrust forwards, which was followed by the discharge of from two to three gallons of fluid with the distinct odour of a cow's afterbirth. Twice subsequently I had to see the heifer, and to complete the first treatment by tearing down adhesions and enlarging the opening.

During her recovery the end of her tail sloughed off.

When last I heard of her she had been in quite good health and comfort for some months, and was then sold to be fattened at grass.

TUBERCULOSIS IN A CART MARE.

By G. MAYALL, M.R.C.V.S.

A BAY cart mare 12 years old had been gradually failing away in condition for about three months, and when being shod had occasionally fallen down. When first my attention was called to her I noticed slightly increased respirations and a temperature of 102° . She was rested for a week and some fever medicine given, and was put to work again. She ate well, as indeed she did all along. After working for a fortnight, during which time she was very sluggish, lacking in life, and getting gradually thinner, she was again thrown off work and isolated. On examination at this time I found a temperature of 103° and pulse of 56, respirations 24 and shallow, there was great tenderness on pressure over the third cervical vertebra, respiratory sounds absent in left lung, and on examination per rectum I could feel what I considered to be a nodular spleen and enlarged mesenteric glands. On November 3 and three following days pulse, temperature, and respirations remained the same, and mare was making a lot more urine than normal. I reported my suspicion of tuberculosis, and as the temperature remained high, and did not give much chance of any useful employment of the tuberculin test, I decided to collect some of her urine and test it according to Ehrlich's diazo reaction (an account of which I had read in the *Veterinary Record* for November 27, 1915, in an article contributed by Mr. G. Gair, M.R.C.V.S.). I passed the catheter and got a 2 ounce bottle full

of the mare's urine. I mixed some of it with the sodium nitrate and sulphanilic and hydrochloric acid solutions, as described in Ehrlich's test, and added 5 drops of ammonia solution and shook the mixture well up. The urine was at once coloured red, the foam was lighter coloured, but, on standing for 24 hours, no blue, green or black colouration of the upper portion of the precipitate was shown. However, taking the results of this test along with the clinical symptoms shown, I felt pretty confident that the mare was tuberculous, and advised her slaughter.

This was done. The *post-mortem* showed: Caseous consolidation of both lungs, only a hand breadth of lung tissue at the base of each lung appearing capable of performing respiratory functions. The spleen was studded with tubercles from the size of a walnut to that of a russet apple, the mesenteric glands were enlarged and cheesy, and the third cervical vertebra and the fifth dorsal vertebra had been attacked by the disease and were inflamed, enlarged, and necrotic. It was a matter of surprise that the mare worked as long as she did do and did not lose more condition. During the last four days of life she never lied down.

For the benefit of those who are not acquainted with the diazo reaction, particulars are herewith given.

For the performance of the test two solutions are necessary.

1	Sodium nitrate	0.5
	Aquæ dest.	100.0
2	Acid sulphanilic	5.0
	Acid hydrochlor.	50.0
	Aquæ dest.	1000.0

Two c.c. of the first and 98 c.c. of the second solution are mixed.

The reaction is carried out thus:—Ten to fifteen c.c. of urine are treated in a test tube with an equal quantity of the reagent, shaken vigorously until a foam is produced, and then about one c.c. of ammonia is added. The reaction is positive if the foam and liquid are both coloured red. Normal urine is only coloured yellow by the test. After 24 hours standing a positive test throws down a precipitate, the upper portion of which is blue, green or black.

As given by Mr. G. Gair, in the non-metric way, the test reads as follows:—"Prepare two fresh solutions: (1) a saturated solution of sulphanilic acid in 5 per cent. of H.Cl.; (2) 5 per

cent. of sodium nitrite. To five c.c. of urine add an equal quantity of solution 1; then add a few drops of solution 2, and shake till frothy; add ammonia till alkaline. A positive result is indicated if the liquid acquires a port wine colour and the froth at the same time becomes red."

We think the test is a very useful one in some cases where tuberculin cannot be properly applied. We shall be glad to hear from other practitioners who have used it

CYANIDE OF POTASSIUM POISONING.

By G. YAILL, F.R.C.V.S., Harrow

CALLED out early one morning last month to see a terrier said to have been suddenly taken seriously ill. On arrival, elicited the following information, viz., that the maids, on coming downstairs that morning (6.30 a.m.) discovered that during the night burglars had paid a visit to the premises, gaining entrance through a barred window in the basement, and had evidently been disturbed, leaving their booty, silver plate, etc., all ready arranged for removal.

The presence of several pieces of meat strewn about the kitchen floor did not excite then suspicion, as the terrier at this time appeared quite well and in his usual spirits. At seven o'clock, however, symptoms of illness became apparent. The dog appeared in a condition of utter prostration upon my arrival, in fact, almost inanimate, pulse barely perceptible, extremities deadly cold, and respirations shallow, although consciousness still remained. Owing to the patient's mistress being seriously ill at the time, the telephone message gave me no particulars, so consequently was unprepared. Upon returning later with the necessary antidotes, the terrier was almost moribund, and passed away at 8.30 a.m.

The pieces of meat, upon examination, were found to be of horse flesh, cut into thick, square portions, a central circular piece having been skilfully cut out, the poison inserted, and the piece replaced. Of the pieces distributed about the floor each contained in its centre a small crystal the size of a pea or very small bean. Its nature could be readily determined by its smell, which was verified by two chemists to whom I submitted it, and who readily recognised the substance to be cyanide of potassium. This case brought vividly to my mind an instance of suspected poisoning I

encountered a year ago of two very beautiful dachshunds, belonging to a client, that died under similar circumstances, showing exactly similar symptoms, but in this case no clue was discovered, a post-mortem examination being prohibited.

This being the first instance of poisoning by cyanide of potassium I remember encountering, I was struck by the extraordinary symptoms shown, the apparent lifelessness of a still conscious animal and the death-like coldness of the whole body. The detective in charge of the case informed me that in his experience he had never before met a case of the kind, and that it must have been the work of expert burglars, whilst the chemists say that cyanide of potassium is readily procurable upon the pretext of destroying wasps.

VESICLE CALCULI IN THE CAT.

By G. YATES, F.R.C.V.S., Harrow.

I HAD the opportunity of examining a cat and watching the course of events that I had had under occasional treatment on and off for a period of two years. At these times a difficulty had been experienced in the passage of urine, and catheterisation resorted to, affording relief on each occasion, together with the after administration of lithontriptics. Latterly, upon removal of the urine it was found to be blood-stained, containing in it small gritty particles of sabulous material which could be readily detected by the fingers. The presence of blood in the urine at this stage suggested cystitis, and a diagnosis was given accordingly. A few days subsequently I was requested to visit again, and found my patient to be suffering from uræmic poisoning, when the owner, at my suggestion, agreed to its destruction.

Post-mortem examination revealed the presence of several small calculi in the urethra. The bladder gave a doughy feel upon manipulation, and externally bore no resemblance to that organ in health; its walls, upon incision, were found to be greatly thickened and devoid of urine; the mucous lining was greatly inflamed, and embedded in this were found about forty small calculi. The ureters appeared normal, and the pelvis of each kidney quite free from any sabulous material.

The cat was a neutered one. Similar cases I have encountered have also occurred in these, and the question arises as to whether such animals are more prone to this affection, and, if such is the case, what is the causal factor?

Translation.

SAND COLIC.

By F. FRIEZ.

MANY losses from sand colic in horses have been recorded by veterinary surgeons since the beginning of the war. The chief feature of the cases has been an accumulation of sand at the level of the pelvic flexure of the large colon. I have investigated 58 cases in three months, and I have experimented with a method of treatment, based on the localisation of the sand, which has given me very appreciable results. For this reason, and in order to diminish fatalities due to this variety of colic, I am publishing the results. A study of the facts is necessary, in order to understand this kind of colic.

Etiology.—Different causes have been invoked to explain the presence of sand in the intestine:—

1. *Pica*, due generally to that which a horse eats insufficiently, or to the ingestion of substances of little nutritive value. This makes our heavy commandeered horses veritable granaries of forage which, not having sufficient intestinal ballast, swallow all that is carried to them to supply this intestinal void. Horses working too hard and not having sufficient maintenance ration, experience the need of ingesting earth or even their own droppings.

2. Another origin of sand rests in the fact of giving oats on the ground, so that the horses ingest particles of earth and sand at the same time as the oats. Again, if one gives oats in the troughs, the horses raising their heads when masticating let fall from their mouths grains of oats impregnated with saliva which collect on the soil particles of earth which the horses afterwards ingest at the same time as the oats.

3. Muddy water, in my opinion, is one of the most important causes. In different occupied provinces I have been able to ascertain that the water at the watering places deposits a certain quantity of sand, and when it rains, this water becomes very turbid. In certain provinces the water was absolutely muddy when it rained; normally, it deposited from 1 to $2\frac{1}{2}$ ounces of sand in 2 gallons of water. Besides, as we shall see, sand formed at the autopsy seems clearly to prove muddy water.

4. A note may be made of dirty, dusty hay, and oats containing foreign matter.

Symptoms.—After the first case of death from this form of colic the attention of the practitioner should be called to fresh cases that he observes. The symptoms, according as the obstruction is incomplete or complete, are particularly characteristic.

1. *Incomplete Obstruction.*—In this case the horse shows dull, intermittent colic absolutely analogous to the colic of impaction. He crouches, gets up, crouches again, but his agitation is not very intense. That which is characteristic is the attitude of stretching out as if to urinate, which the horse assumes every moment; he remains sometimes for a very long time in this position, appears to make efforts to urinate deceiving the ordinary person who is assured that the colic is due to the impossibility of making water. Pulse and respiration are normal. At times a little sand is evacuated with the dung. If the horse is treated at the time, the colic limits itself to these manifestations, but they are often aggravated, and we arrive at Case 2.

2. *Obstruction is Complete.*—The stretching-out attitude becomes more and more frequent and is accompanied with groans; the flank swells out, especially on the right. The respiration becomes rapid and deep, the nostrils are extremely dilated, the face drawn, the m.m. of the eye is injected, and the look fixed. The pulse, at first small and thready, becomes imperceptible; the horse dies without great pain. Rectal exploration reveals at the entrance of the pelvis in front of the pubis, a pasty, compressible mass in which one can feel small irregular grains calling sand to mind at once.

Sometimes a small quantity of sand is brought away by injections; the anus and the perineum are soiled; in this case there is no possible doubt as to the cause of the colic.

Diagnosis.—The first case is always difficult to diagnose, but one must recollect the frequent extended position of the horse as if to urinate. Backraking may be usefully undertaken.

Duration.—Certain sand colics last 8 days.

In grave cases, two hours after the first symptoms the horse dies.

Prognosis.—If the obstruction is incomplete, cure is assured

if treatment is timely. If the obstruction is complete, prognosis is very grave.

Lesions.—Carcase greatly tympanitic, mucous membrane of rectum often protruding.

General Lesions.—Blood thick, black, asphyxiated, mucous membranes violet tinged.

Abdominal Lesions.—Generally sand is found in the pelvic flexure of the large colon and in greater quantity in the second than third portion of the colon, as if the sand, having made its way in the sterno-pubic direction, peristaltic action was powerless to pass it on into the third portion. When the weight of sand is heavy enough, it presses the pelvic flexure into the inferior parts of the abdomen. The quantity of sand found was variable; the smallest quantity was about $2\frac{1}{2}$ lbs., the largest about $26\frac{1}{2}$ lbs. The sand found was granitic sand similar to that in the camping places, and it resembled in all points that obtained from sedimentation of the drinking water.

There was never any sand in the cæcum, but sometimes a little in the substernal and diaphragmatic flexures of the colon, as well as in the small colon.

Treatment.—*1. Preventive.*—Insist on a sufficient ration of hay for heavy horses to furnish them a sufficient intestinal ballast; do not make horses work beyond their production ration. With horses that have a tendency to lick, fasten them short and sufficiently high that they cannot reach the soil, especially at the time of grooming.

2. Do not let them eat oats from the ground; give them in nose-bags or in sufficiently large troughs; in this latter case, when the horses have finished eating, raise the mangers and brush the ground to carry away the oats fallen during the feeding. Whenever possible, pave the ground at the place where the mangers rest.

3. Let the drinking water stand, above all when it rains, at least an hour before giving it to the horses. If the flow of water at the watering-place is continuous, put two square planks across it to facilitate the deposit of sand. Chemical procedure recommended for purifying water is not necessary.

When several cases of colic have declared themselves, it is advisable to immediately purge all the horses of this portion

of the unit. Each horse is purged with 500 grammes of sulphate of soda dissolved in four litres of warm water and mixed with a litre of oil. Purgation is repeated two days after, if evacuation of sand is insufficient.

II. *Curative Treatment*.—When one has diagnosed a case of sand colic according as the obstruction is incomplete or complete, one treats it in the following way:—

1. *The Obstruction is Incomplete*.—In this case give the horse immediately 500 grammes of sulphate of soda dissolved in four litres of tepid water in which has been incorporated one litre of oil of arachides (earth nut). About ten minutes afterwards give an injection of 5 centigrammes of eserine. I give also about every half-hour 10 litres of salted water (a handful of kitchen salt to 10 litres of water) as an enema, and in such a way that the horse does not throw out the injection until 10 litres have been injected; to accomplish this it is only necessary to pinch the anus between the thumb and index finger each time that one withdraws the pipe of the syringe. These enemas greatly assist the evacuation of the sand on its arrival in the small colon and help purgation and the action of the eserine. Generally three to four hours after these measures have been taken the horse evacuates sand. If it is assumed that the ejection of sand is insufficient, one can renew the purgation six hours afterwards.

The horse being cured, he is submitted for eight hours to a laxative diet with drink at will. If the season and circumstances allow, green food is desirable. Backraking with slight abdominal massage is recommended.

If, in spite of the attention given, the horse does not evacuate sand, and the flank commences to distend, then the case develops into:—

2. *The Obstruction is Complete*.—Sometimes it is rapidly complete from the beginning. In this case before all it is necessary to administer the purgative indicated without, however, having recourse to the eserine. When the obstruction is complete, the horse is given over to certain death; it is in this case that the procedure I am going to indicate is adopted; it has given me six cures out of eight horses treated *in extremis*. This is the way I operate when the horse shows signs of complete obstruction.

1. Administer the drink of sodium sulphate and oil.
2. Prepare 10 litres of ~~terid~~ water containing 75 grammes of marine salt. Attach an injector to a piece of indiarubber tubing 2 metres long, and with the tubing of sufficient diameter to adapt itself on to the trocar which serves to puncture the cæcum.
3. Implant the trocar at the site of puncture of the cæcum (selecting the point most dilated by gas one punctures at this place, whether it be occupied by the cæcum or the first portion of the large colon; in cases of sand colic it is generally the colon that one punctures); let a certain quantity of gas escape, so that the flank declines slightly, but one should take care not to let all the gas out, but only sufficient to allow contact to persist between the colon and the wall of the flank.
4. Adapt the tubing to the cannula and let the liquid flow into the colon so that the 10 litres of salted water is all passed in. In this way little chance exists of introducing any fluid into the peritoneum; it is necessary to follow all the movements of the horse with the cannula and to make sure that the trocar is well in the intestine by raising the tubing and noticing whether gas escapes from the cannula.
5. The injection over, the trocar is withdrawn and the puncture point tamponed with tincture of iodine. The horse is then hobbled and thrown on his left side. He is then put in the dorso-lumbar position a little inclined to the left side. One assistant holds his head and another his tail.
6. At this moment one makes an injection of 5 centigrammes of eserine and massages lightly the pelvic flexure through the rectum.

The sand which, as we have seen, is above all dense in the second portion of the colon and does not seem to be able to pass on account of insufficiency of peristaltic movement, is henceforth in a position particularly favourable for its progression. At first it is disintegrated by contact with the injected water; in effect on the standing animal the water arrives at the substernal curvature, and gains the second portion while the horse is down. Afterwards the disintegrated sand progresses little by little into the third portion of the colon under the influence of purgation and of the re-arousing of intestinal contrac-

tions excited by the eserine and by the massage of the pelvic curvature.

7. The horse is left lying on his back for half an hour. When he is released and stands up, tepid water is given which he usually drinks eagerly; his flanks are rubbed and he is walked about, and now and again salted enemas are given.

A short time after borborygmus and expulsion of gas occur, and the obstruction has been overcome. Little by little sand appears two to three hours after intervention, and sometimes even on the morrow. In spite of tardy expulsion of sand, one need not be anxious if one gives drink at will and administers another purgative dose on the morrow.

Laxative diet, salt in the food and coffee (ground) as a stimulant and antidote against intoxication are subsequently indicated. It would be presumptuous to assert that the related procedure will succeed in all cases of sand colic; it, however, appears to us as indicated in grave cases. As this form of colic is frequent in certain regions, I consider it useful to give my colleagues the benefit of my experience.

An observation conducted in collaboration with our colleague M. Descouets makes us believe that the same method of intervention would give excellent results in intestinal obstruction due to impaction.

(*Revue Générale de Médecine Vétérinaire.*)
G.M.

THE NATIONAL HERB-GROWING ASSOCIATION.

THIS enterprise, made known to the public only in January last, has grown in a manner that may claim to be unprecedented. The membership is now close on 2,000, not including members of affiliated "local centres," which represent some hundreds more.

Members are taught how to grow, to collect, and how to prepare for sale, pack, and so forth.

A drying shed opened at Byfleet early in the spring was, after a very few weeks of use, burnt to the ground, owing to a faulty boiler. With the shed perished sixty pounds worth of the first prepared material. This made it necessary to set members on, for the remainder of this season, drying for themselves.

One hundred tons of drug plants (prepared or fresh, according to order) have been marketed.

Starting with the share of an office, and part time of a

secretary, there are now five offices, and a staff of ten or twelve paid workers, and much voluntary help is constantly given.

Neither the staff nor the space at command is anything like sufficient for the constantly increasing work.

Lectures and demonstrations have been given in thirty places; many more are being arranged for. Printing of the requisite literature can scarcely get done fast enough to keep pace with the demand. Sixty thousand pamphlets, etc., had been sent out by the middle of October.

It is now necessary to divide up the Society into two sections —a co-operative division, to carry on its trading, and another to advise, organise, lecture, publish and distribute literature.

Information as to the scheme adopted can be had of the Secretary, 20, 21 (6), Queen Anne's Chambers, Westminster.

It must be understood that this work of restoring in Great Britain and Ireland the provision of our own drug herbs is, and must be, carried on as a business, and not a "hobby," as someone wrote lately; not as a sentiment. It was realised by the founders at the outset that, if done at all, it must become (as it has) a national movement, with commercial aims.

From a small beginning, it sprang into growth more rapidly than ever they had anticipated; it has been a hard struggle to cope with a rush of (*a*) members wanting instruction, and clearing up of their mistakes; and (*b*) the demands of druggists and other purchasers. There was no precedent to go on, no patronage given, no grants-in-aid. What has been done arises from sheer hard work, and determination not to be beaten.

The founders knew from the first that presently growers must be found to give acres of land to the cultivation of the necessary herbs; when the war is over, and labour available, this can be achieved; now, thanks are due to any and all who can devote small spaces for the purpose. If it had not been for the good-will and industry of small growers, the hundred tons could never have been supplied as a result of ten months' campaign.

As winter brings a lull in the work of directing growers and collectors, attention will be chiefly directed to lecturing, forming new centres, and preparing to erect drying sheds, of which in time, it is hoped that a sufficient number will be dotted over the country, to provide accessible drying places for all "centres."

A fund is opened for these, to which donations are solicited. More members are sought for the "Association" or educational division, and shareholders for the Co-operative or trading section.

A FOUNDER-MEMBER.

Correspondence.

PARACENTESIS ABDOMINIS.

To the Editor of THE VETERINARY JOURNAL.

SIR,—Just a few lines in criticism of the letter of "Old Practitioner" in your issue of November. He says, "we puncture on either side, and just as often as necessary." The wisdom of puncturing on either side in the case of a mare far advanced in pregnancy is not evident. We do not consider that Mr. Bond meant to infer that puncturing the bowel would undo a twist, but that it might cause a twist not to occur. Why does not "Old Practitioner" tell us what twist of the bowel is due to, or what he considers it due to? This might benefit the younger men, and some of us older ones as well. How does "O.P." know that in the majority of his cases "the twist is present from the first"? I think if the majority of practitioners ignore the colic drink idea, they may as well ignore the ledger too. Does "O.P." always find on post-mortem that with his up-to-date methods he has always been treating the disease? If so, then I am of opinion that his experience is different from that of other practitioners.

"MIDDLE-AGED PRACTITIONER."

BOOKS FOR PRISONERS OF WAR.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—Requests continue to reach us from British prisoners of war for books on Veterinary subjects, and you would greatly aid the efforts of my committee if you would be so good as to make, in your next issue, the intimation which I have suggested overleaf, and would invite the co-operation of your readers in securing these books for the benefit of the British prisoners who appeal for them. This is essentially a matter in which it is in the power of the Press to render us great assistance, and I feel sure I may count on your doing what you can to help our work.

—I am, yours truly,

Board of Education,

Whitehall, S.W., 23rd November, 1916.

ALFRED T. DAVIS, *Chairman.*

BRITISH PRISONERS OF WAR BOOK SCHEME
(EDUCATIONAL).

THE above war charity—the officially recognised medium for providing British prisoners of war with books for purposes of serious study—makes an urgent appeal for works on Veterinary subjects, to meet actual requests received from British prisoners (soldiers, sailors, and civilians) interned in enemy or neutral countries.

Among the special books asked for this week are:—*Breaking and Riding* (Hayes), *Training Young Horses to Jump* (Brooker), *Veterinary Surgery* (any book), and *Horses* (Major Dibble).

Readers who may be able and willing to contribute one or more of the above works to this excellent war charity are invited to forward to Mr. A. T. Davies, at the Board of Education, Whitehall, London, S.W., a list of the books they can offer. They will then be notified as to the acceptance of their gifts. Further particulars of the book scheme may be had on application.

ELECTORAL AND PARLIAMENTARY LEAGUE.

We have received the following letter and circular, which explain themselves.

English Branch of the World League Against
Vivisection and for the Protection of Animals.

123, Elgin Crescent,
London, W., 30th September, 1916.

DEAR SIR,

May we beg the favour of your signing this memorial, which please kindly return in the enclosed envelope.—Yours faithfully,
A. L. WOODWARD.

“ To Major-General Sir W. H. Birkbeck, Head of the Army Remount Department.

The undersigned, veterinary surgeons of Great Britain, deplore the terrible sufferings of Army remount horses when picketed in the open during the last two inclement winters—sufferings which have occasioned the loss of many valuable animals, and that by a slow and very painful death through exposure to cold, and consequent pulmonary complaints. And they also deplore the great waste of public money—at a time when the nation needs a most careful husbanding of its resources—involved in the unnecessary deaths of so many valuable animals.

Your memorialists earnestly and respectfully beg that, wherever possible, the picketing of horses in the open may be avoided in inclement weather, and where this is found

impossible that care may be taken that they may be picketed in sheltered places, and that a blanket and waterproof covering may be provided for each horse."

[Needless to write that we have not signed the memorial, because we object to putting our name to statements that are not supported by scientific and actual evidence. We publish them so that our readers may express their opinions on the matter.
—G. M.]

ON GETTING RICH QUICKLY.

We have received the following, which has been addressed to one of our English contributors and forwarded on to us. We have his permission to publish it, and think it will amuse our readers.

Offices of R. D. Stockton,

10 and 11, Equitable Building.

DEAR SIR.—Knowing that you are always interested and open for an investment in a good, live business proposition, I take the liberty of presenting to you what seems to me a most wonderful business proposition, and in which, no doubt, you will take a lively interest, and perhaps wire me the amount of stock that you wish to subscribe towards the formation of this company.

The object of this company is to operate a large cat ranch in or near Aurora, where land may be purchased cheap for that purpose.

To start with, we will collect about, say, one hundred thousand cats. Each cat will average twelve kittens a year. The skins run from ten cents each for the white ones to seventy-five cents for the pure black. This will give us twelve million skins a year, to sell at an average of thirty cents apiece, making our revenue about ten thousand dollars a day.

A man can skin fifty cats a day for two dollars. It will take one hundred men to operate the ranch, and, therefore, the net profit will be about nine thousand eight hundred dollars a day.

We will feed the cats on rats, and will start a rat ranch next door. The rats multiply four times as fast as the cats. If we start with one million rats, we will have, therefore, four rats per day for each cat, which is plenty.

Now, then, we will feed the rats with the carcases of the cats from which the skins have been taken, giving each rat a fourth of a cat.

It will thus be seen that the business will be self-acting and automatic all the way through. The cats will eat the rats and the rats will eat the cats, and we will get the skins.

Awaiting your prompt reply, and trusting that you appreciate the opportunity that I give you, which will get you rich very quickly.—I remain, very truly yours,

R. D. STOCKTON.

Denver, Colorado.

Reviews.

Veterinary Report, 1915: Ceylon. By G. W. Sturgess, M.R.C.V.S., Govt. Veterinary Surgeon.

THE résumé of the infective diseases in Ceylon shows that the veterinary wants of the island are being well looked after by Mr. Sturgess and his staff. An outbreak of anthrax occurred in the police horses, but the case was limited to one horse, which lived for four days (a rather lengthy period). Rinderpest showed a marked decrease in number of outbreaks. There were over 2,300 cases of foot-and mouth disease, of which only 2 per cent. died. Economically, treatment of the epidemic seems to have paid well. A bull treated for surra with sodium arsenite made a good recovery.

A peculiar epidemic among swine caused heavy losses. The disease did not appear to be either swine fever or swine erysipelas, but an acute septicaemia and toxæmia of the nature of swine plague. The fatalities were 90 to 100 per cent. Among dairy cattle a cancerous horn disease was noticed. The cows were never yoked, so this supposed cause of the ailment was barred out. Amputation of the horn in the early stages is the only chance of successful treatment, and early slaughter of affected animals is recommended.

Sarcoptic mange in goats caused some trouble, but was eradicated by dipping in a solution of Izat (1 oz. to the gallon of water), and afterwards dressing with a mixture of kerosene, sulphur and coco-nut oil.

The Report seems to show that veterinary operations in Ceylon are well conducted and of great value to the Island.

G.M.

Report of the Chief Veterinary Surgeon of Southern Rhodesia for the year 1915.

MR. J. M. SINCLAIR, M.R.C.V.S., sends us his Annual Report on the infective diseases in this region. African Coast Fever has been very prevalent during the year. The Compulsory Dipping Ordinance was petitioned for by cattle owners, but it could not be promptly put into force, and energetic measures by which 60 dipping tanks were put up in a short space of time

helped materially in getting the outbreak under. The effects of dipping were nullified in some districts by the heavy rainfalls, and the Chief suggests that sheds wherein the cattle could be detained until dry would be helpful. The heavy rains and insufficient protection of calves caused severe losses in the herds. In one herd of cattle the twisted stomach worm (*Hæmonchus contortus*) caused 250 deaths. No cases of tuberculosis occurred during the year. The mortality among horses from horse-sickness was the heaviest for many years, but mules suffered to a much less degree, due to immunisation by the Theiler method. Blue tongue among sheep caused severe losses in the eastern districts. Cattle from Northern Rhodesia were prohibited from coming into the Southern area as contagious pleuro-pneumonia was rife in the former area, and thus the prohibition originally imposed on account of the uncertainty of the rinderpest position in German East Africa had to be continued. The Report tells of a large amount of work well done, and the control of a big territory has evidently been by no means an easy task.

G.M.

The Rhodesia Agricultural Journal. Edited by the Director of Agriculture, assisted by the staff of the Agricultural Department. October 1916. 5s. per annum. Published bi-monthly. Printed by the Argus P. and P. Co., Ltd., Salisbury, Rhodesia.

Mr. L. E. W. BEVAN, M.R.C.V.S., Government Veterinary Bacteriologist for Southern Rhodesia, sends us a copy of this very useful agricultural journal. Some cattle feeding experiments undertaken by Mr. R. C. Simmons show that feeding and grazing may be advantageously combined from the time the grass reappears until May, but when frost comes there is a loss in partial grazing. A five months' period of feeding was more profitable than a six and a half months' time. A saving was effected by using cheaper foods and avoiding mangels. Maize, various kinds of hay, majorda melons, and ground nuts were among the substances used.

Experiments in the production of new crops for Rhodesia have been undertaken by J. A. T. Walters, B.A., and the importance of his work cannot be over-estimated.

Mr. Bevan contributes the first portion of an interesting article on "Immunity in its Relation to the Stock Diseases of Southern

Rhodesia." The article is simply written, with homely instances given of nature's means of resisting disease as applied to the province. A very clear resumé is also given of the history of immunity.

The Veterinary Report shows that four cases of tuberculosis in cattle were notified from the Johannesburg abattoirs. No cases of glanders were found in imported horses and mules. Plasmosis inoculation on five bulls received from Great Britain was conducted, and the animals were discharged; twenty-four horses, the property of the B.S.A. Police, were inoculated against horse-sickness. Progress seems to have been achieved against African coast fever, and in several of the districts no fresh outbreaks were recorded. The report furnished by the Chief Veterinary Surgeon, Mr. J. M. Sinclair, is a short account of valuable work efficiently carried out.

G. M.

Journal of the Royal Army Medical Corps, edited by Colonel W. H. Horrocks, K.H.S., assisted by Colonel D. Harvey, R.A.M.C. Issued monthly. Printed by Bale, Sons, & Danielsson, Ltd., 83-91, Great Titchfield Street, Oxford Street, W. Price 2s. monthly net.

As a medical periodical, this journal keeps up to the high character and interesting nature of previous issues. It is full of articles which are instructive, and written by authors that seem to take a pride and pleasure in their work. However scanty clinical records from the front are in veterinary fields, those who look after the health and wounds of our soldiers seem to have no difficulty in supplying very readable accounts of what they are doing.

Albert E. Morison, F.R.C.S., and Lieutenant W. J. Tulloch, R.A.M.C., contribute a well-illustrated article on "The Treatment of wounds in War by Magnesium Sulphate." The solution of Mag. Sulph. is made by dissolving forty ounces of $MgSO_4$ (by weight) in ten ounces of glycerine, and boiling water sufficient to make a Winchester quart by measure. The glycerine must be added slowly while the solution is hot, and stirred gently, or the salt precipitates on cooling. The solution is then sterilised in an autoclave, and is ready for use. It is not advised to use this solution as a first dressing to fresh wounds, but only after swabbing the wounded surface with pure carbolic acid and pack-

ing it for twenty-four hours with gauze wrung out in a lotion of (1 in 20) carbolic acid. Where MgSO₄ is used "lymph lavage" is most satisfactorily produced, and fomentations with this agent only need renewal twice daily, a great advantage where asepticism and little pain is desired. Nephritis was very prevalent in the British troops in Flanders in spring and summer of 1915. A remarkable feature of the outbreak was that the Indian troops escaped almost entirely. Bronchitis and dropsy were shown as complaints accompanying the nephritis. The mortality was low, and Sir John Rose Bradford, who is the author of the paper on this subject, considers that clinically the malady is a distinct nephritis. A specially interesting contribution is that by Lieutenant-Colonel Barron, M.V.O., on "Physical Training with reference to Convalescents." The aspect of the question that confronts us is well indicated by the writer in the following words: "Morally and economically it will be our duty to cure completely as many of them as possible. It will take perhaps a year or more, during which time the patient should remain under military discipline, and should receive proper treatment, carried out on a scientific basis under a system to be laid down. The tendency will be to let the men drift back into civil life, in order to save expense." The Colonel gives the four essentials of physical training as pleasure, exercise, balance, and rest. He has a good word to say for the game of Ballee or Gusto for convalescents. This paper is a very valuable one at the present time, and might be studied with advantage by all superintendents of hospitals who have to advise convalescents.

Other profitable reading matter may be found in "Experiences of Twelve Months X-Ray Work in France," "Gunshot Wound of Pericardium and Heart," and "Acute Hodgkins Disease," which by its vagaries puzzled the faculty.

Those who like to read of the work of mercy and the difficulties and adventures in carrying it out will be greatly interested in the moving narrative of how No. 3. General Hospital mobilised and travelled, had a somewhat chequered career, and finally reached a haven of joy and content. Colonel S. F. Clark, A.M.S., who contributes the tale, has a facile and ready pen, and his description of the progress of the hospital is most interesting reading.

THE LATE CAPTAIN H. C. LOWRY.

IT IS with deep regret we place on record a further loss sustained by the Veterinary Department in the death of Mr. H. C. Lowry, M.R.C.V.S., who died in Mesopotamia recently. Mr. Lowry entered the Service in February, 1913. He was at the time a member of the Special Reserve of Officers, Army Veterinary Corps. When the war broke out, he was on African coast fever duty in the Melsetter district, and was shortly afterwards recalled by the military authorities. He was present at the landing in Gallipoli, and served throughout that campaign, during which he had a very narrow escape, when a box he was sitting on was shot from under him by a shell. The following day he received a slight bullet wound in the arm, but not sufficient to interfere with duty. Early this year he was sent to Mesopotamia. A few days before the cable news of his death arrived, the Chief Veterinary Surgeon received a letter from Captain Lowry, in which he gave an interesting account of the conditions obtaining in Mesopotamia, some technical details of his professional work with the Army, and sent affectionate messages to his many Rhodesian friends. He concluded that letter with a wish that the war was over, and that he "was back to the land of sunshine and fruit." Mr. Lowry, who was promoted captain some months before his death, was well known in Rhodesia, especially in Bulawayo district. He was very keen on his work, and his death is felt as a great loss to the Department.—*Rhodesia Agricultural Journal.*

"WELLCOME" BACILLUS ABORTUS VACCINE.

THIS vaccine, originally issued in bottles of 25 c.c. containing 100,000 million organisms in each c.c., is now obtainable in phials containing 100,000 million organisms in 5 c.c., 250,000 million organisms in 5 c.c., and 500,000 million organisms in 5 c.c.

NOTE—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Bailliére, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown ink on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Bailliére, Tindall and Cox.

AUSTRALIAN SUPPLEMENT OF THE “VETERINARY JOURNAL.”

By Members of the Staff of the Veterinary School,
Melbourne University, Australia.

INTERFERENCE IN VARIOUS GAITS AND SOME SUGGESTED REMEDIES.

By E. F. J. BORDEAUX, B. ès L., B.V.Sc.

Lecturer in Zootechny and Shoeing, Veterinary School, Melbourne University.

I PROPOSE to briefly describe the various forms of interference which have come under my notice, and suggest remedies where possible.

The examples which I will give are the most exaggerated forms which I have come across. As every experienced horseman knows, these defects vary in intensity from a slight defect to pronounced unsoundness.

It is difficult to classify forms of interference, so I will consider them at the various paces, *i.e.*, walk, trot, and gallop. I have purposely omitted pacing, which, though claimed to be a natural gait, is acquired in many instances by the use of hopples. The difficulty of passing from this gait into any other has caused pacing to be excluded from the Army and riding schools.

Interferences at a walk.—Stumbling, brushing, striking, cutting, overreaching.

Stumbling may be defined as an inability of placing the foot on the ground in a normal way, heel first.

Causes.—Low withers or straight shoulders and pasterns, which cause the centre of gravity to be too far forward. Lymphatic temperament. In young horses it is often due to clumsiness. It may also be caused by unsound joints preventing complete flexion or extension, or unsound feet, especially on rough and hard ground.

Remedies.—Conformation cannot be altered, but extension may be developed by suitable exercise. The centre of gravity may be moved backwards by teaching the horse to carry his head

high, which will also increase the forward reach of the front limb by tension on the M. brachio-cephalicus. Suitable shoeing, such as turning up the toe, may cure or mitigate the evil. Sluggishness is best remedied by vigorous riding or driving. Clumsiness by a course of riding school work, which, when judiciously done, will improve any horse, and turn a clumsy animal into a serviceable and agreeable hack or driving horse. Should stumbling be due to unsound joints limiting flexion, there is no remedy unless the unsoundness can be removed by rest or surgical methods. Tender feet may be improved by shoeing, such as removing pressure from affected parts or using rubber pads. A confirmed stumbler is only fit to drive in a four-wheeled conveyance.

Brushing is a continual tapping of one foot against some part of the opposite limb.

Causes.—Defective conformation, such as narrow body with knees and toes turned out, and cow hocks. In narrow-chested horses with toes turned out, the brushing is due to the inward swing of the foot during flexion. After careful examination of a great many unshod feet, I have come to the conclusion that the majority of horses do not wear level behind. In the majority of cases the outside wall is shorter than the inside one. If the foot be levelled by the farrier, the horse may brush even when his conformation is good. Horses with narrow croups and cow hocks are most predisposed to brushing behind. The rocking of a heavy vehicle, especially a two-wheeler or the weight of a heavy rider or breaking work, will increase the tendency to brush. I may point out that a horse which goes close without actually touching will brush when put in a new kind of work, or when a swelling appears on any of the limbs near the place where the opposite foot clears it. Given a good conformation, brushing may be caused by want of condition, overwork, or bad shoeing. The most common faults in shoeing are: firstly, uneven bearing surface, one side being left too high, or else an attempt being made to straighten a foot of which the wall is naturally lower on one side than on the other; secondly, rasping the inside surface of the wall, with the intention of giving more room to the foot to clear the opposite limb, when in reality it only spoils the ground surface of the foot without attaining the object aimed at; thirdly, the so-called brushing shoe, usually fitted close on

the inside (even under the sole, as the wall has usually been rasped away) and full on the outside. This practice may place the feet slightly further apart, but invariably brings the fetlocks closer together.

Nature having moulded the horse's foot to a certain shape, I will not admit the capacity of the farrier to improve on it. I would suggest that technical education might improve the shoeing smith.

Remedies.—Cases due to want of condition should be remedied by a generous diet and well-regulated work before interfering with the feet; the reverse is the usual procedure. For front feet, a slight alteration in the swing of the limb will avoid the interference, and to obtain that the toe of the shoe may be made square, and even a small piece welded on to the outside toe in a line with the front of the shoe. The object of this is to make the horse "break" straighter over the toe. *In no case must the wall surface be rasped away.*

I have seen many devices tried by blacksmiths to "cure brushing." I am convinced that the remedy nearly always induces a condition worse than the original trouble. The best remedy, when the foot has not been mutilated by rasping the surface of the wall, is to exercise the horse without shoes until his feet have worn themselves to their natural bearing, and then to apply a well-fitting shoe, following exactly the outline of the wall, except perhaps at the extremity of the heels where the fitting may be slightly fuller, *but it must be the same on both sides of the foot.* I may state that I have adopted this system in every case for many years, and have found it almost infallible, the only exception being when the conformation or action are extremely defective.

One of the worst cases of brushing I ever saw was in a two-year-old thoroughbred, which was very narrow and very leggy. The only pace at which this horse could clear his legs was the gallop, at which he showed a great turn of speed for a short distance.

Walking or trotting he plaited (placed one foot in front of the other), and injured himself to such an extent, notwithstanding the protection afforded by boots, that his training had to be given up.

Striking is a severe form of brushing, and is very uncommon at a walk.

Cutting is a form of brushing aggravated by an abrasion of the skin, caused either by the sharp border of the shoe or by a defective clinch.

Overreaching being more common at the faster paces will be considered later.

Interference at a trot.—These include stumbling, brushing, speedy cutting, bruising of elbows, overreaching, forging, and scalping. Most of the interferences at a trot take place when the "pace is on," except forging, which is sometimes caused by lazy going, coupled with careless or incompetent driving.

As a rule, the faster the speed the greater the injury when interference does take place.

Stumbling, brushing, striking, and cutting are produced in the same way as at the walk, but the consequences are usually more serious.

Speedy Cutting, so-called because it usually takes place at a flying trot, is an injury under the knee caused by the opposite front foot. The result may be a simple bruise with a thickening of the skin, or a haemotoma or an exostosis (the so-called knee spavin). As speedy cutting is attributable to the same causes as brushing the same remedies may be applied, bearing in mind that light shoes and lowering the head will have a tendency to make the horse go "closer to the ground." Pacers which have a tendency to brush or speedy cut sometimes wear a spreading gear connected to the shaft of the sulky to prevent them from striking. This is one of the many patent gears which may be seen at trotting courses.

It is hardly conceivable that the rules of racing allow the use of such contrivances to correct defects of conformation or gait. A horse requiring this sort of mechanical help would be useless for ordinary purposes, yet he is sometimes allowed to win big stakes by racing.

Cutting or bruising of the elbow by the feet is sometimes seen in horses with extravagant action.

Remedy.—Apply light shoes and, if possible, lower the position of the head. If the defect persists or the above means are not applicable, elbow pads are the best palliative.

Interference between the front and hind limbs happens either at the end of the stride, just before the fore limb leaves the ground, or during the period of suspension.

Overreaching happens at the end of the stride; the toe of the hind foot catches the heel or quarter of the fore foot just on the outside quarter of the fore foot, but it may be sometimes on the inside. It is not an uncommon thing for a horse which has a tendency to strike his fore and hind legs together to travel with one hind foot between the two front ones, the other hind foot moving on the outside of the fore limbs; this defective gait (sometimes termed cross-firing) explains why the injury is possible on the inside as well as the outside quarter or heel.

Forging or Clacking takes place at the beginning of the period of suspension; the noise, which is most objectionable may be accompanied by a wearing away of the wall of the hind foot, which may ultimately cause lameness.

When the interference takes place later in the period of suspension, it is the coronet, suffraginis, fetlock, metatarsus, or even the inside of the hock which gets struck by the front foot, and this defect is known as *scalping*. As a rule, the greater the speed the higher the injury. For this reason, marks on the metatarsus are generally referred to as speedy cutting in the same way as the marks under the knees in the fore limbs. Violent or continuous striking of any of these structures may result in conditions such as exostosis, arthritis, &c. Some veterinarians will not admit the traumatic origin of side-bone. But I am quite convinced that in light horses, and particularly in fast trotters, a side-bone may be produced solely by traumatism. When only one side-bone is present, and that under the scar produced by overreaching, it is hardly necessary to look for another cause. I could name numerous instances of this. The causes of interference between the fore and hind limbs may be low withers, or any other cause which has a tendency to overload the forehand, and place the centre of gravity forward, or to delay the action of the front limbs, but the most common cause is an excessive length of limb in proportion to the body. Forcing the pace will create or aggravate the evil. A horse which is "over paced" sometimes develops a hop or skip behind to avoid scalping. This fault, when well established, is hard to eradicate.

The remedies for interference between the front and hind limb at a trot are: Development of the extensors of the fore limbs by heavy shoes; transference of the centre of gravity backwards by elevating the head, which will also increase the forward reach of the fore limbs by tension of the M. brachio-cephalicus; preventing the horse from dwelling on the toe in front by turning up the shoes. (This method is supposed to shorten the stride and reduce the pace.) Not allowing a horse to move very fast until

he has been well gaited and carries good condition. Drive steady, but keep the horse up to the bit until fit.

American farriers claim to have invented a variety of shoes to "spread" the horses' hind feet out and make them step outside of the fore feet. I have no faith in these appliances. I have seen good horsemen attain the same results without them, and I have also seen the appliances fail to produce the wonderful effects claimed for them. As a rule, the more incompetent the horseman, the more artificial and mechanical aids he will look for.

Before dealing with the interferences at the gallop, it might be as well to give a definition of this pull and draw attention to the phases of contact and suspension. The gallop may be defined as a pace in four time, in which the almost simultaneous beats of one diagonal biped occur between the two successive beats of the opposite diagonal biped, which commences the stride with the corresponding posterior limb. Each stride is separated from the next by an interval of suspension.

The order of contact of the limbs is:—

(1) When leading on the near fore: off hind, near hind, off fore, near fore, suspension.

(2) When leading on the off fore: near hind, off hind, near fore, off fore, suspension.

Many horses which cannot clear their legs laterally when walking or trotting never touch themselves at a gallop. Striking of two front or two hind legs is more of the nature of an accident and is often attributable to an outside cause, such as a bump inflicted by another horse, or a sudden pull on the mouth causing a lateral displacement of the centre of gravity. Under normal conditions, especially when the horse is of the "narrow gauge" variety, the lateral displacement of the centre of gravity at the gallop is very slight. This may account for the rare lateral interference at that pace.

On the other hand, interference between the fore and hind limbs is fairly common.

The periods of contact in the gallop are about of equal duration, except in the case of the leading leg, which is a little longer, and it is this leg which is generally the cause of the trouble. As in the trot, the interference takes place either at the end of the stride because the leading fore leg has not got away quick enough from the opposite hind one, or during the period of suspension.

Overreaching is an injury caused to the leading fore leg at the heel or higher, even as high as the knee, by the opposite hind leg just before the period of suspension.

During the period of suspension the toe or inside quarter of

the leading fore leg may strike the opposite hind one at any place between the coronet and hock. The most common cause of injury between fore and hind legs at the gallop is an excessive length of limb in proportion to the body. This explains why so many two-year-old horses show this defect and get rid of it when they are fully developed.

In some cases, however, the "leggy" conformation persists, and so does the interference.

Another cause is overweighting of the forehand due to a heavy conformation, low withers, or the position of the rider (Sloan seat). Overreaching may be sometimes caused accidentally by a sudden pull on the mouth, especially when the horse carries a curb.

Injuries inflicted at a gallop may be very serious, especially when the traumatism is near a joint.

Beyond shoeing with tips in front and placing the rider further back there is little to be done. I am convinced that a course of "school" work would produce much improvement, but racing men would never consent to the experiment. They even sometimes resent the suggestion that the jockey should be asked to sit a little further back.

Injury to the elbow by the foot of the same leg appears uncommon in galloping horses. This defect is supposed to be incompatible with speed, but Velasquez used to injure himself in that way, and he was a first-class racehorse. Newhaven showed the same defect at the time he won the Melbourne Cup. The best palliative is to remove the shoes for fast work or racing. Finally, a horse may blemish himself when lying down or standing. The so-called "shoe boil" is caused by the horse lying with his heel pressing against his elbow. The cause of it is, I think, a narrow stall or box, or just ordinary confinement, as I have never seen it in a horse living in the field. The remedy consists in placing round the suffraginis a sufficiently thick circular pad to prevent flexion of the suffraginis on the metacarpus. Most horses will become quite accustomed to these pads, which seem more practical than an elbow pad. A steeplechaser once developed a shoe boil, and was fitted with a pad round the suffraginis of the offending leg, but he promptly developed the same blemish on the other side; another pad was placed on the second leg, and the trouble ceased.

A standing horse may blemish himself by placing one heel on top and in front of the other foot, which may result in an injury to the coronet. This attitude may be adopted by unsound horses to relieve the pressure on contracted tendons or spavined hocks; sometimes it is merely a bad habit with no apparent cause.

SPLENIC ABSCESS: A SECONDARY AFFECTION TO PARASITISM BY *SPIROPTERA MEGASTOMA* IN THE HORSE.

By H. R. SEDDON, B.V.Sc.

Veterinary School, University of Melbourne.

SPECIMENS of spleen showing purulent and necrotic lesions have on several occasions been sent to this institute for examination. The history in these cases has been that of rather sudden death after a comparatively short illness, though some symptoms may have been shown for the previous three or four weeks. The specimens have been chiefly from aged draught stock and the cases have occurred chiefly in the summer.

The spleen has contained a huge abscess—up to the size of a football and occurring usually rather nearer one end of the organ. This abscess enlarges the organ to about an equal amount on either side and is somewhat sharply circumscribed, but not encapsulated, nor is the capsule of the organ thickened to any great extent. On section little purulent material is found, but the "abscess" seems to be made up of areas the size of a pea of necrotic material, those areas being packed closely together with little fibrous tissue between. In colour the central areas are greyish or yellowish and towards the periphery they acquire a red or haemorrhagic appearance. The spleen pulp surrounding this necrotic lesion is softer than normal and intensely congested.

Microscopical examination of the lesions shows numerous streptococci.

Recently a further specimen was sent, where, in addition to the necrotic lesion in the spleen, there was fibrous adhesion between that organ and the stomach and in which the liver was also involved in the inflammatory process.

An opportunity presented itself of investigation on the property from which this last-mentioned specimen was sent, and it was only then that the mode of entrance of the streptococci was definitely determined.

Here was found a two-year-old filly which I was informed commenced to fall away six weeks previously. The animal was now much emaciated in spite of the fact that during this period of illness it had been especially cared for by the owner, and had retained a good appetite. It had a staring coat, was very weak, and when forced to move dragged the hind limbs. The mucous membranes were blanched and showed some petechial spots.

There was an oedematous swelling along the floor of the abdomen. Temperature was subnormal.

The filly was killed and *post-mortem* examination revealed the following: Blood obviously hydræmic. Oedema of subcutaneous tissue of maxillary space, inferior cervical, pectoral and abdominal regions. The pleural cavity contained a slight excess of fluid and the pericardial sac about 5 oz. of clear straw-coloured fluid. The lungs and heart were normal. The abdomen contained a slight excess of fluid. The liver and kidneys appeared normal. The stomach wall contained several large worm tumours, the largest being the size of an orange. On incision this large one was seen to have been practically converted into an abscess. No parasites remained and a large cavity containing greyish white, purulent material filled the mass. A sinus extended through the wall of the stomach and into a thick mass of fibrous tissue which joined the spleen and the stomach wall. In the splenic tissue opposite this fibrous attachment there was a fluctuating mass the size of a coconut. On section this abscess presented the characteristic appearance, viz., greyish necrotic material in centre; no pus formation, though the whole was very soft; and the periphery somewhat haemorrhagic.

Microscopical examination shows numerous long chains of streptococci present throughout the splenic lesion.

Beyond this large abscess the remainder of the spleen appeared normal.

Other worm tumours in the stomach showed numerous parasites (*Spiroptera megastoma*) and only the usual small quantity of purulent material (containing living parasites) exuded on pressure. The omentum was increased in size and oedematous and the chain of lymphatic glands lying therein markedly enlarged, haemorrhagic and oedematous. The small intestines contained a few parasites, but the cæcum and double colon were extensively infested with various species of nematodes, *Cylicostomum* species being especially numerous. The mucous membrane showed numerous pin-point haemorrhages.

On the same property was another filly exhibiting the same symptoms and in addition marked tenderness on palpation over the region of the spleen, the animal being probably affected with the same complaint, including an abscess of the spleen.

The owner of these animals informed me that he had had, in addition to the three animals mentioned (two seen by me and specimens from the third), another animal affected similarly. The general trend of symptoms, it should be mentioned, was the same in all these three animals, viz., gradual loss of condition for three to six weeks, great weakness and death, the appetite keeping good till the end.

This fourth animal was a filly which had died three months previously (in the spring). *Post-mortem* examination by the owner had shown multiple abscesses of the liver with adhesions between that organ and the stomach. The stomach, unfortunately, was not opened, nor was the condition of the spleen especially noted.

While in that district an opportunity presented itself of conducting a *post-mortem* examination on another horse—a yearling—which was killed when apparently *in extremis*. This animal was badly affected with parasites of the large intestine and also presented numerous (the majority very early) worm tumours of the stomach. There were in this animal also inflammatory changes in the omentum, marked by increased vascularity and oedema, and a small abscess about the size of an acorn was present just underneath the serous cavity of the stomach. This abscess likewise communicated with a spiroptera tumour of the stomach. The lungs of this animal showed broncho-pneumonia, evidently the result of a drench that had been given, there being still traces of oil in this organ. Had this animal survived the effects of the intestinal parasitism (and also the drenching) it would similarly, no doubt, have shown more marked lesions in the omentum and the spleen.

Enquiries of owners elicited the fact that there had been no corresponding mortality heretofore, other than a case which occurred in 1907, which was also a drought year for that part. This animal was an aged mare with three-months-old foal at foot. She suddenly commenced to fall away in condition and died in about a fortnight. *Post-mortem* examination by the owner showed “a tumour in the spleen the size of a football.” It seems likely this was a similar case.

It would be noted that *Spiroptera megastoma* is very prevalent in Victoria, but although the writer has had the opportunity of examining many horses affected with this parasite he has not previously encountered this secondary affection of the spleen.

It should be noted, however, that these cases recorded occurred in a district which had been badly affected by the drought. Grass pasture had almost disappeared and the animals were being fed on chaff. Perhaps these unusual conditions were responsible in some way for this affection.

It is to be observed that in the cases investigated infestation by *Cylicostomum* was heavy and was probably sufficient to cause many of the symptoms, so that it seems as if the whole illness and death is to be referred not only to the effects of the spiroptera and the streptococcic lesions in the spleen, but also to the effects of these intestinal parasites as well.

Clinicals.

ADENO-CARCINOMA OF UNDESCENDED TESTIS.

By J. C. LEWIS, D.V.Sc., B.Sc.

Lecturer in Surgery and Anatomy, Melbourne University.

UNDESCENDED testis in the dog does not appear to be a common occurrence, and though abdominal retention has been observed at the Hospital Surgical Clinic several times associated with inguinal hernia, it is the first case of undescended testicle retained in the inguinal canal that has come under my notice.

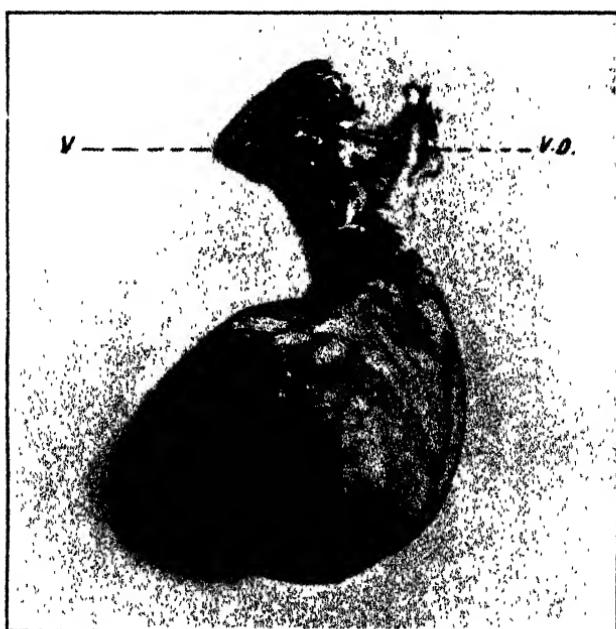


FIG. 1.—Illustrating case of adeno-carcinoma of undescended testis.
V, blood-vessels; *V.D.*, vas deferens.

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The animal, a five-year-old fox-terrier, was admitted with a hernia swelling in the left inguinal region. Examination showed a firm, solid enlargement, almost immovable, on the site of the internal abdominal ring. The swelling was not reducible, while the denser part of the growth presented a movable attachment which was palpably not unlike gut.

The scrotum gave a clue to the nature of the condition.

Only one testicle was present and that, for the size of the dog, being unusually small.

The owner's history was that a small swelling was noticed in the groin a few months previously, and had grown rapidly during the last few weeks, though there was no pain and no general disturbance. Cutting down on to the swelling as for hernia a greatly enlarged testicle was removed (fig. 1), severing the cord after gentle tension in order that it may be excised as



FIG. 2.—Peritoneal sac divided and reflected, and the new growth seen in section, showing : *S*, peritoneal sac; *V*, thrombosed vessels; *H*, haemorrhagic area of the tumour and the whole gland replaced by new tissue.

high as possible; the inguinal ring and the skin being closed in the usual way.

The testicle, when removed, proved to be much enlarged and rounded, with an equally enlarged epididymis attached, the structure being contained in a thickened tunica vaginalis and situated just external to the abdominal ring, the peritoneal sac in no way communicating with the scrotum.

Section of the organ showed a firm new growth, involving the whole of the tissue of the gland, with a haemorrhagic area representing the portion of more active growth. At this point ulceration had occurred into the cavity of the sac.

Microscopic examination went to show that the new growth was one of the adeno-carcinoma type. This appears to be in line with the findings on the human side, where new growths of the testis are met with more commonly in the undescended glands and generally take the form of carcinoma.

No secondaries could be discovered in any of the neighbouring lymphatic glands, and as nothing further has been heard from the owner since discharge of the animal, it has been concluded that no complication has occurred.

VISUAL EXAMINATION OF THE BLADDER.

By J. C. LEWIS, D.V.Sc., B.Sc.

In the larger animals the means at our disposal for the examination of the bladder are very limited, if we exclude such instruments as the electric cystoscope; and many cases arise in which it would be of the greatest advantage to get an eye picture of the vesical mucous membrane. In the horse and mare we have had in the past to rely on the use of the catheter and sound, together with rectal or vaginal palpation; but even these methods often fall short where a calculus or new growth is small and where the nature of the mucous membrane is not discoverable by the character of the urine.

Such a case arose in the surgical clinic recently. An aged draught horse was admitted with incontinence of urine which had been becoming progressively worse for the last twelve months, the urine constantly dribbling away, with little or no pain and no acute symptoms.

The bladder, by examination per rectum, contained a large quantity of urine, though the walls were in no way tense and pressure causing a discharge from the urethra. The catheter was passed easily into the bladder, but was not capable of emptying the viscus. It was thus obvious that a certain amount of atony was present, whether or not associated with calculus or growth.

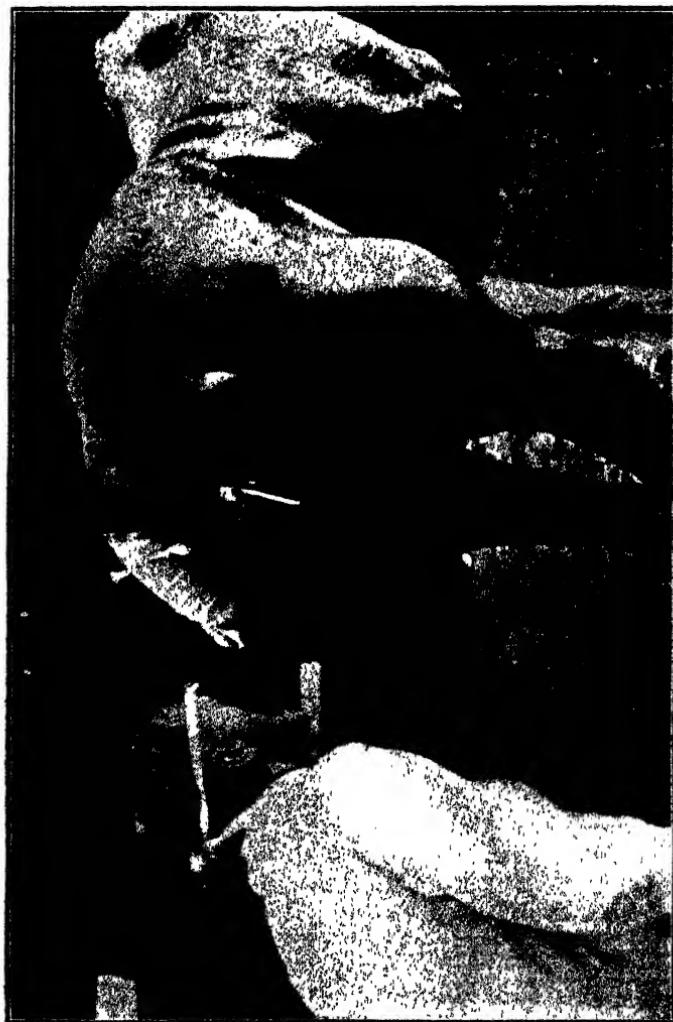


FIG. 3.—Examination of the bladder by means of proctoscope in position in the urethra, and illumination.

A perineal urethrotomy was performed, having a fairly large urethral opening, the mucous membrane being stitched to the skin with silkworm gut. For further examination it was possible from this opening to pass along Kelly's proctoscope into the bladder, the lumen of the urethra taking the tube fairly easily. Good inspection of the whole of the mucous membrane was then possible by illumination with an ordinary frontal mirror.

In this case retention of the urine dependent on atony had produced a chronic cystitis with large areas of sloughing mucous membrane and many haemorrhagic spots. Whether the cystitis was the cause or result of the retained urine is difficult to determine, but it is not unlikely that a mild infection of the bladder may have been the starting point of the trouble, the constant presence of urine aggravating the condition when atony set in.

It could be seen that very little contraction of the bladder took place and that the urine merely dribbled away as formed, leaving the bladder containing urine to the level of the pelvic outlet. When this residual urine was withdrawn by means of a syringe, a marked line divided the mucous membrane sharply into two portions, the lower one being affected to a much greater degree and representing the part constantly in contact with urine.

By continual withdrawal of the urine and the use of silver nitrate a certain amount of improvement was effected in the condition of the upper part of the bladder, whilst the lower half appeared refractory to all treatment, presenting the same haemorrhagic appearance with many sloughing areas.

Some weeks of this treatment, daily completely emptying the bladder by means of a syringe, was productive of a visible improvement in tone, but a certain amount of dribbling still persisted, all the urine being voided through the perineal opening.

The case may be used to show that the examination of the bladder by this method (shown in fig. 3) will demonstrate clearly the nature of the internal aspect of the bladder; though, as in the case described, an atonic bladder may afford a better opportunity for the use of this instrument, and it is equally valuable in other cases where calculi or growth has escaped detection by other methods of examination.

NOTES.

PROFESSOR WOODRUFF, Dean of the Faculty of Veterinary Science, Melbourne University, has been appointed to the rank of major with the Remount Unit of the Expeditionary Forces and is now in Egypt.

Prior to his departure he was entertained by the members of the School staff and presented with a wrist watch as a souvenir of the occasion. The present students took the opportunity of expressing their appreciation and esteem by making Major Woodruff a presentation of an illuminated address and mounted riding crop.

The veterinary profession of Australia is to be congratulated that Major Woodruff is with the Forces and that the Defence Department has been able, by appointment to the rank as he now holds, to suitably recognize his worth and ability. All will join in wishing Professor Woodruff a speedy and safe return.

The demand for veterinary officers has been so great that very few are now available for the Forces now in formation. In view of this the School has made arrangements whereby the course has been shortened considerably by the cutting down of most of the vacations and the condensation of the work. It is hoped that in this way to provide competent men at least six months earlier than in normal times without detracting in any way from the efficiency of the graduates or the standard of the instruction.

Of the Victorian graduates serving at the Front with the Expeditionary Forces as veterinary officers, we might mention: Colonel E. A. Kendall, Captains Matson, Norman McDonald, Heslop, Robin, McLennan, Seelenmeyer, McKenna, Hankin, and Talbot; while many others are engaged in transport or other military work.

Mr. Dickenson, B.V.Sc., a graduate of last year, has been appointed Chief Veterinary Officer to the Northern Territory of Australia, the position being vacated by the resignation of Mr. McEacheran, M.R.C.V.S., who has joined the Veterinary Department of New South Wales.

Arrangements have been made by the Defence Department with the Veterinary Research Institute for a constant supply of antimeningococcal serum, the great advantages gained by the use of the local product having been demonstrated in the treatment of this disease. Mr. Seddon, B.V.Sc., is associated with the work on the veterinary side. A large quantity of serum has already been supplied.

AUSTRALIAN SUPPLEMENT OF THE “VETERINARY JOURNAL.”

By Members of the Staff of the Veterinary School,
Melbourne University, Australia.

OSSEOUS DISEASES IN AUSTRALIA.

By W. T. KENDALL, D.V.Sc., M.R.C.V.S.

BONE diseases that are known by different names in different localities are of frequent occurrence, more especially in the coastal regions of Australia.

The so-called cripples, rickets and coast disease in cattle, nasal disease in horses, brittle bones in sheep, and cripples in swine are examples of the terminology in use amongst stock-owners, while osteo-porosis, osteo-malacia, fragilitas osseum and mollitis osseum, &c., are spoken of by veterinary surgeons. The latter names are no more applicable than the former, for in many instances all these pathological conditions are met with in the same animal.

Bone diseases, however, are not nearly so prevalent in farm stock now as they were thirty or forty years ago, for the reason that the soil and climatic conditions which give rise to them, though still existent, are better understood, and effective means of prevention are adopted. In the early days of colonization it was found that if young animals, especially cattle and horses, were allowed to graze too long on poor, innutritious, and indigestible grasses grown on the sandy, heather-covered coastal districts, they almost invariably became rickety, but that, if removed inland to better soil and pasturage during certain times of the year, many escaped an attack, and even affected animals often recovered.

It was found that adult animals, especially heavy milking cows, were very liable to become affected with cripples on poor granity soils, particularly during long periods of drought, and experience has taught the dairy farmers that the disease may be prevented and often cured by giving the cows the separated milk to drink and providing them with a good allowance of bran.

From thirty to forty years ago the so-called nasal disease (osteopetrosis) was very prevalent amongst young blood horses in training around Melbourne, probably for the reason that nearly all the oaten and wheaten hay, which forms the staple for stable horses, was at that time grown within carting distance of the city, on land that had been cropped continuously without manuring for thirty or more years. As soon, however, as hay began to come in by rail from new ground the disease gradually disappeared, and for many years there was not a case to be seen; it is further interesting to note that during the last few years there has been a mild recrudescence, and probably for the same reason, viz., soil exhaustion.

The question naturally arises: How is it that young race-horses in training are so susceptible to the disease, while ordinary working horses fed on hay and oats grown under the same conditions are rarely affected? The explanation appears to be that young racehorses are put to work at a much earlier age and during the active dentition period, and are consequently more predisposed to dietetic troubles.

SYMPTOMS OF COAST DISEASE IN CATTLE.

The young animals are unthrifty, stunted, and dwarfed in their growth, the back is arched, the forelegs bowed outward; in some cases to such an extent that the sternum almost touches the ground. The hind legs are bent in the opposite direction, the hocks touching, and the lower parts of the legs spread out like a stool. The head may present the appearance of a two-year-old heifer or steer, while the pelvis is narrow, and the body is that of a pot-bellied calf. The joints, especially the knees and hocks, are often enlarged and distorted, the skin is scurvy and dirty, and the old hair remains unshed. The deciduous teeth are also slow in shedding.

SYMPTOMS OF CRIPPLES IN DAIRY CATTLE.

Usually, before any anatomical changes are observable, some members of the herd, generally the best milkers, develop an inordinate propensity for chewing bones, sticks, or any hard substance they can get hold of, even dead rabbits. Stockowners attribute many deaths among cattle to eating poisoned rabbits. That deaths do occur from chewing and swallowing the remains of rabbits is undoubtedly, but not from the direct effects of the

poisoned wheat or other material used for poisoning the rabbits; they are usually cases of septicæmia from injuries caused to the alimentary canal by swallowed fragments of bone.

The first positive sign of *cripples* is stiffness or lameness in walking, and if the beast be carefully examined, enlargement of one or both knees may be noticed. Similar swellings in other joints may follow, the lameness increases, and the forelegs begin to give way and bend under the weight of the animal, indicating that softening of the bones has commenced. The affected beast assumes an unthrifty appearance, the appetite is not seriously affected, and the quantity of milk may be but slightly diminished. When a milking cow is dried off and put into another pasture she may recover and be all right again when she comes into calve. This is a clear indication that milking when the forage is lacking in the necessary nutritious elements is too heavy a drain on the system; in long periods of drought there is not sufficient moisture in the soil to dissolve the saline plant constituents, consequently both the herbage and the animals subsisting upon it suffer. A similar lack of saline material may also occur from an entirely opposite cause, viz., excessive leaching of poor, sandy, and granity soils during rainy seasons, and it may be due to the effects of growing crops on irrigated areas that they will in time be deficient in bone-forming material.

SYMPTOMS OF NASAL DISEASE IN HORSES.

The first indication of osseous disease in young horses in training is often great leg weariness after work; this is followed by decided lameness, often mistaken for rheumatism. A careful examination generally reveals some alteration in the bone structures. There may be slight enlargement of the lower extremities of the radial bones just in front of the upper part of the knee-joint, or a slight bulging of the nasal or lachrymal bones. In some cases swelling of the bones is first noticed in the true regions of the temporo-maxillary articulation. Unless an animal so affected is immediately thrown out of work and put out on grass the disease rapidly becomes worse, and the animal is quite unfit for work. The appetite becomes capricious, and the animal has a listless, weary look. A very game colt may throw his lameness off when he goes for a gallop, but suffers for it afterwards. If turned out into a good pasture for a few

months recovery may take place without further treatment. Lucerne pastures are believed to be the best. As a rule, however, a colt that has had a bad attack seldom recovers sufficiently to be able to race successfully. Good results have sometimes been obtained by administration of phosphate of calcium, arsenical and ferruginous compounds, but it is imperative that the affected horse should cease work and be placed under natural conditions.

FATAL INTESTINAL PARASITISM IN HORSES.

BY GEORGINA SWEET, D.Sc., AND H. R. SEDDON, B.V.Sc.

Melbourne University Veterinary School.

FOLLOWING the observations made by one of us (H. R. S.) in the Murray River district in 1915, and recorded in this Journal recently, it was of interest to us to have the opportunity of investigating some cases of fatal intestinal parasitism which occurred in horses in the Sale district in May, 1915. Losses among horses had been occurring near Sale and in many other parts of Victoria during the months of December to May, including the period of the previous observations referred to. We were especially interested, therefore, in investigating cases in a district far removed geographically and in character from the Murray River district, though this part also had been affected by the prevailing drought.

Investigations were made on two properties, one of which was the Sale Common and the other private property.

The Common.—This consists chiefly of morass country, bounded on one side by the river (from which, however, it is fenced off), and on two other sides by a narrow strip of high ground. The high ground shows little vegetation—gum trees and some weeds (chiefly *Senecio lautus*, Soland). The morass is covered with moss (*Sagina procumbens*, L. ? “The spreading pearlwort”), on which a grass (*Paspalum distichum*, L.) is gradually encroaching. It is boggy during the winter, but at the time of our visit was quite dry. The herbage (grass and moss) was very dry, and in its then condition of little value as food. The water supply is by troughs from (1) the river, and (2) a billabong, to which latter the stock also have access. The

Common had been undoubtedly overstocked during the previous few months owing to the lack of pasture elsewhere.

Case 1.—We were fortunate in seeing on the Common one animal, a two-year-old draught colt, showing symptoms which, we were informed, were typical of the "Common disease." These symptoms were: A general unthrifty appearance of the animal; an irregular gait of the hind limbs, marked by a dragging of the toes and a tendency to knuckle over at the fetlock, the limbs being spread wide apart so that the animal rather floundered along; when chased a couple of hundred yards the animal became dyspnoeic and stopped. Examined then the m.m. of the conjunctivæ was rather cyanosed, respirations laboured, and the heart beating violently. The animal was not broken-winded. After being allowed to rest for some minutes the animal regained the normal, the conjunctivæ becoming pale but with a yellowish tinge.

The animal was killed, and *post-mortem* examination showed some anaemia, but not very marked. The stomach and large intestines contained a large quantity of ingesta. Nematodes were extremely numerous in cæcum and colon, and many were adherent to the m.m., which showed numerous small ulcerations due to the parasites. There were also a number of *Gastrophilus* larvæ attached to the m.m. of the large colon, and a number of *Anoplocephala perfoliata* and *A. plicata* in the cæcum. The m.m. of the small intestine was normal in appearance. The stomach contained some nodules of *Spiroptera megastoma*, and the pylorus contained numerous *Gastrophilus* larvæ—two species being present. These Spiroptera nodules were not associated with any pyogenic condition affecting the stomach wall or omentum, such as was met with in the cases seen in the Murray River district (*vide infra*), nor was there any splenic infection. There was a small parasitic (*Strongylus vulgaris*) aneurism of the anterior mesenteric artery, and evidence of the same parasite having wandered through the lung, liver, mesenteric lymphatic glands and omentum, small fibrous and calcareous nodules (probably degenerated worms) being present in these organs. There were also two adults lying encysted in nodules in the omentum. Other organs did not present gross lesions. The private property was also visited, and there we found similar cases, one of which was autopsied.

Case 2.—This was a three-year-old mare which had been reared on high ground (some miles away from the swampy parts along the river), and had been during the month of March on the morass portion of its owner's property, i.e., the part abutting on the Common. Thereafter this animal, along with others, has been in other paddocks on the same property. These latter paddocks, although not part of the morass along the river, are themselves rather low and in parts swampy. The animal had showed symptoms for only two days, and died the day before we saw it. We were informed that it showed the same symptoms as those that had died on the Common. The cases on this property were reported to have shown symptoms for only a day or two, and then to have gone down, unable to rise again. (We are of opinion that the symptoms were, in fact, manifested by this stock earlier than stated, but were not noted. This is shown by the owner's remark that he had only one other animal affected, whereas we found three showing very definite symptoms, these symptoms being similar to those shown by Case 1 on the Common.)

Post-mortem examination of the animal was unsatisfactory, the carcase showing marked putrefaction. Numerous nematode parasites were present in the alimentary canal, as in Case 1.

Out of one series of twenty animals which had been depastured similarly to the above mare the owner had lost five within the fortnight preceding our visit. At this time the remainder were being hand-fed, and among them were three showing symptoms of general unthriftiness with irregular gait in the hind limbs. One of these also showed œdema in the pectoral region. These three animals, therefore, seemed to be affected with the same complaint.

The nematodes met with in the intestines of the two cases examined as above were chiefly:—

Strongylus edentatus, *S. vulgaris*.

Cylicostomum labratum, *C. labiatum*, *C. poculatum* and other undetermined species, and *Triodontophorus intermedius*.

Of these nematodes, *Strongylus equinum*, *S. edentatus*, *Cylicostomum labratum*, *C. labiatum*, *C. catinatum* (?) and *C. poculatum*, with some undetermined species, had been met with in specimens from previous fatal cases in the same district.

From our investigations we are of opinion that the cause of the mortality among the horses depastured on the Sale Common and on other morass country in the vicinity is to be ascribed to the combined effects of excessive infestation by the above-named nematode parasites and to the lack of nutritious food, the parasitism being the more intense and serious on account of the

debilitated condition induced by the latter. It will further be seen that the cases now described differ from those observed in the Murray River district in that these Sale cases showed no evidence of secondary splenic infection through Spiroptera nodules, but owed their ill-effects entirely to the intense intestinal parasitism.

Clinicals.

THROMBOSIS OF THE SPERMATIC VEINS.

By J. C. LEWIS, D.V.Sc., B.Sc.

Melbourne University Veterinary School.

A VALUABLE merino ram, aged 4 years, was noticed by the owner to have a swelling in the scrotal region which he believed to be hernia.

The animal had been examined by him, owing to the fact that the season before the ram had obtained very few lambs, and during the present season had been entirely indifferent to the duties expected of him.

On examination it was found that a large fusiform swelling existed in each cord, about 9 in. in length, occupying the space between the abdominal inguinal ring and the testis, tapering away to a point at either extremity. It could be found to terminate just before reaching the ring on the one hand, and that it did not involve the testis on the other.

The swelling in the left cord was the larger. In addition, the testes were much atrophied and abnormally flaccid in consistence, while, owing to the weight of the swellings above them, were dependent almost to the ground.

The condition was easily differentiated from hernia by its consistence and shape and the normality of the abdominal ring.

An area in the line of incision was anaesthetized locally over the whole lateral length of the growth and the part laid open to the cremasteric fascia. This tunic was not thickened, though greatly enlarged to contain the affected structures of the cord. Within the fascia the growth was found to consist of a huge thrombosis involving the pampiniform plexus, surrounding and strangulating the spermatic artery, which, though not occluded by clot, showed practically no lumen, the interference with the arterial supply accounting for the atrophy of the gland.

It was impossible to dissect the thrombosed veins away from the artery by operation, and, considering the state of the testis with the improbability of regeneration, it was considered advisable

to remove the whole structure after ligation, the wound being stitched up with silkworm gut sutures, and a drainage tube inserted at the bottom of the sac.

It is of practical importance to consider what predisposing conditions are associated with this disease, as it is no small loss to have a thousand-guinea ram rendered useless early in his career.

We know in the human subject in connection with varicocele

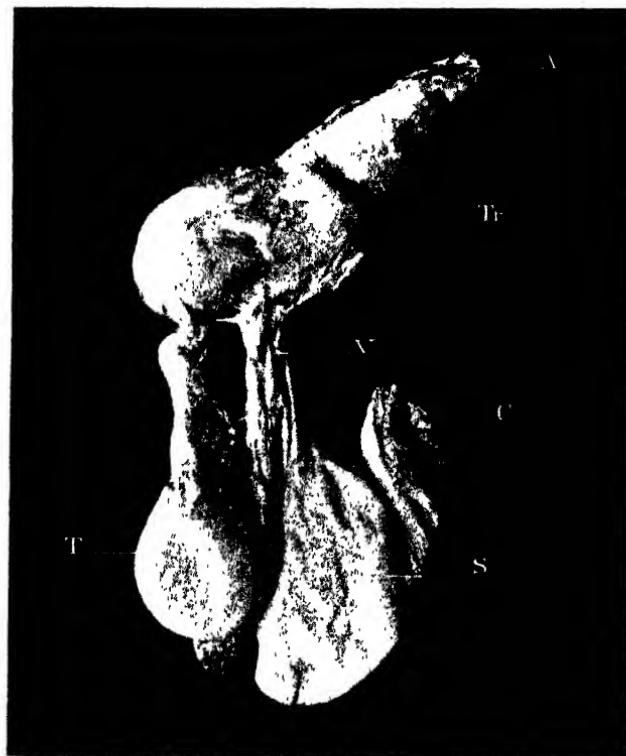


Figure showing testis and thrombosis removed from merino ram. The sac opened and peeled back from the testis. A, spermatic artery; Tr, thrombosis; V, vas deferens; S, sac; T, testis; C, cremaster muscle.

that in many cases the tendency is inherited, and that further certain environment and conditions tend to aggravate the disease. In rams certain of these conditions may operate together with any tendency which may be present. The highly pedigreed hand-fed ram is not called upon for much in the way of exercise, hence the inclination for the blood to become sluggish in the venous system generally. The increased vascularity of the region during the breeding period in a part normally very depen-

dent together with the great length of the spermatic veins, the almost entire absence of valves are all probable factors which influence the occurrence of the disease.

As there were a number of ram lambs by this animal from the previous season on the holding they were examined at the same time, but none showed any similar disease of the cord. There was, however, a ram of about the same age which had been introduced from the same stud from which the affected animal was obtained. Curiously enough, the spermatic cord on either side showed a firm swelling about the size of an egg midway between the abdomen and the testis, and appeared to be the same condition in an earlier stage of development. On either side of this area some varicosity of the venous plexus seemed to exist.

This midway position then seems to point to the starting place of the thrombosis, though there appears to be no apparent reason on anatomical grounds.

Careful inquiry into the history of the stud producing the rams brought forth evidence pointing to several other animals, closely related, being similarly affected, though nothing very definite in the way of history could be obtained. It seems probable that pastoralists have confused the condition with inguinal hernia.

In conclusion, we may state that there seems some evidence of the tendency of the disease to be inherited, that the method of feeding and pampering valuable rams leads to an inactive state that predisposes the animal to loss of circulatory tone, and, further, that it is not advisable to tax the animal's potency with too great a number of ewes.

Regarding operative treatment, when the potency of the animal has already been interfered with, there appears to be no chance of recovery. There is no reason, however, why, if the condition were observed early removal of the thrombosed mass by ligation should not benefit the case. It would mean, however, a systematic examination of the animals periodically in order to recognize the first stages of the disease.

CYSTOCELE IN A COLLIE DOG.

AN aged collie dog was admitted to the Surgical Clinic with a large swelling in the perineal region which had been present for some months. The condition appeared to give the animal no inconvenience, except during the defæcatory act when pain was most acute.

Examination of the part under morphine showed that pressure on the swelling produced a flow of urine, and when the bladder

was empty the part still contained quite a mass of dense hard tissue.

As the dog was old the owner preferred that the animal be destroyed. *Post-mortem* examination revealed the bladder dislocated through the pelvis into the perineal region, having broken down the urinogenital diaphragm to occupy a position below the

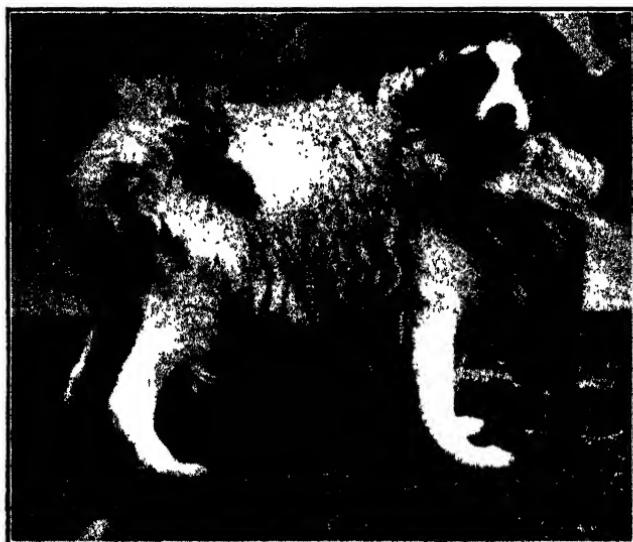


Figure illustrating case in text. The cystocele showing as a large swelling in the perineal region.

anus. The wall of the bladder was densely thickened with several hard fibrous nodular areas, and was intimately adherent to the fascia and skin which alone separated it from the exterior. I should consider the condition of the present case to be inoperable.

The only other case of this nature which appears to be on record is one described by Professor Woodruff some years ago, the condition, strangely enough, being in an aged collie dog.

NOTES.

THE Annual Inaugural Address of the Melbourne University Veterinary School was given at the Research Institute on March 20, the Lord Mayor of Melbourne, Sir David Hennessey, occupying the chair.

Professor A. J. Ewart, D.Sc., Ph.D., F.L.S., Acting Dean of the Faculty of Veterinary Science, delivered the Inaugural Address, entitled "Animal and Plant Co-operation and

Antagonisms." The lecture was well illustrated with lantern slides. The interdependence of the two great kingdoms dealt with was well brought out in the lecture.

Dr. W. T. Kendall, Acting Director of the Institute, then read the Annual Report of the University Veterinary School, 1915.

MR. CHAIRMAN, LADIES AND GENTLEMEN,—Owing to the absence of our Director, Professor Woodruff, who is on active service with the Army Veterinary Corps in Egypt, it falls to my lot to present the Annual Report.

Altogether forty-four Victorian veterinary surgeons, many of them graduates of this School, have enlisted mostly for active service abroad. A few are on transport duty. Some are stationed at the home dépôts, and six are serving in the Imperial Army Veterinary Corps. Very few veterinary students have enlisted as combatants, as they have been advised by the Defence Department to complete their course before enlisting for military service, as it is felt, in view of the shortage of qualified veterinary surgeons for the Army, their services as professional men will be of more value to the country than as individuals in the fighting ranks.

When it became obvious that the demand for veterinary surgeons would be greater than could be immediately supplied, it was decided that we should do all in our power to increase the number of available men as rapidly as possible without in any way impairing the efficiency of the graduates. To this end it was arranged to continue working through the vacations, except a short holiday at Christmas and a fortnight before each examination; in this way we are able now to cover the work of the second, third, and fourth academic years in two calendar years with practically the same number of lectures and demonstrations and the same amount of practical work, so that we can turn out men ready for active service from six to twelve months earlier than would be done in the ordinary course, with the understanding that, when so qualified they will immediately volunteer for active service in the Army Veterinary Corps. This and the absence of Major Woodruff has necessitated some rearrangement of the work of the staff, and I am pleased to say that both the staff and the students have entered into the scheme with great enthusiasm.

During the year over 1,100 cases have been treated in the free clinique, including 637 horses, 370 dogs, and 69 cats, the rest being made up of goats, pigs, fowls, cage birds, &c., so that the students have had good opportunity for good practical training. Besides doing practically all the minor operations and dressing, they have seen Dr. Lewis perform a large number of major operations both in the free clinique and for metropolitan

practitioners, and have themselves performed them on the cadaver under his supervision.

During the latter part of last year the Research Institute was engaged, in collaboration with the Bacteriology Department of the University, in the preparation of anti-meningococcal serum for the Defence Department. The work was commenced in July, and supplies of serum of the required potency were produced by the end of September. Over 850 doses were prepared up to the end of December, and the results obtained with this serum have been highly satisfactory.

As a result of this the Federal Government in November last intimated that they would like the work continued during 1916, but on a much larger scale. Arrangements have, therefore, been made for the supply of 10,000 doses before September next. This has necessitated additional accommodation for horses, extra apparatus, and more assistance for both Dr. Bull and Mr. Seddon. The Federal Government have, therefore, provided twelve boxes and an additional operating room at the School with sufficient funds for other requirements.

The work is so divided that the Bacteriology Department prepares the inoculation material and conducts periodical tests of the serum in order to ascertain its potency; the Veterinary School undertakes the inoculation, bleeding, and care of the horses, and the collection, preparation, and distribution of the serum.

It is pleasing to report that the work is proceeding satisfactorily, and there is every reason to expect that all the anti-meningococcal serum required will be available. Experience in the past with the Australian form of cerebrospinal meningitis has shown that anti-serum produced with the local strain of the microbe is more effective than that from strains from elsewhere.

I have also much pleasure in announcing that, in addition to the various scholarships and medals that may be gained by the student during his career, and the Caroline Kay Scholarship for graduates, there is to be, also for graduates, a very handsome Fellowship—the Walter and Eliza Hall Veterinary Science Research Fellowship—granted by the trustees of the Walter and Eliza Hall Trust. This will be of the value of £250 per annum, with a similar amount for expenses.

Medals and prizes awarded during the year are:—

Silver Medal for Proficiency in First Year Subjects: H. E. Albiston.

Payne Exhibition, Gilruth Gold Medal for Pathology and Bacteriology, Royal Agricultural Society's Silver Medal and Prize for Clinical Medicine and Surgery: W. A. Jones.

AUSTRALIAN SUPPLEMENT OF THE “VETERINARY JOURNAL.”

By Members of the Staff of the Veterinary School,
Melbourne University, Australia.

Original Communications.

A NEW FORM OF LYMPHANGITIS IN ARMY HORSES.

By CAPTAIN G. G. HESLOP, B.V.Sc. (Melbourne),
Australian Army Veterinary Corps.

In the latter part of July, 1915, during military operations on Gallipoli Peninsula, a disease broke out amongst certain horses belonging to one of the Australian Batteries of Field Artillery, then operating at Cape Helles.

Owing to the similarity of this disease to glanders and farcy, and owing to the fact that the mallein test gave a negative reaction in each case, it has been decided to place these cases on record.

The writer has had no practical experience of glanders, as this disease has never occurred in Australia, but his suspicions of glanders in these animals were supported by several veterinary surgeons in the A.V.C. who saw them and who had had considerable experience with glanders in its clinical manifestations.

Remount No. 6,138.—Bay mare, 7 years, an Australian bred animal, was noticed on July 28th, 1915, with a slight catarrhal discharge from both nostrils; pyrexia ($T. 102.9^{\circ}$ F.), slight lachrymation from eyes, general dulness and depression, and loss of appetite. This animal was isolated and treated for catarrhal fever, the treatment consisting of light feed (green stuff and bran mashes), salines in the drinking water, and inhalations of *ol. eucalypti*. Temperature rose to 103.2° F. on the next day, but thereafter dropped and alternated between 100.4° and 101° F. Discharge from nostrils continued and increased slightly, being extremely tenacious and requiring constant spongeing to keep

the nostrils clean; both nostrils were affected. Schneiderian mucous membranes injected, but there was no ulceration. Lachrymation continued without increasing until ten days after isolation, and then finally subsided, the slight conjunctivitis present being treated with weak ac. boric solution. Six days after isolation this case showed nodular swellings, five in number, varying in size from that of a pea to a hazel nut, situated in the jugular furrow on the right side midway between the throat and sternum. These swellings were at first isolated, but gradually increased in size and had a tendency to run together. On the tenth day the first of these swellings burst and liberated a small quantity of pale amber-coloured fluid, semi-jellylike in consistency and somewhat glutinous.

Further swellings manifested themselves along the jugular furrow, as many as twenty-two being counted extending from the lower third of the jugular furrow to the angle of the lower jaw, but only on the right side. Other swellings appeared on outside of lower jaw and in scapular region of shoulder.

These swellings attained a maximum size of about that of a small walnut and burst in from 5 to 7 days. They continued to discharge pale amber-coloured sticky material, which in some became purulent. These ulcers gave off a peculiar and offensive odour not unlike that given off by that of a bad case of greasy heels. Ulcers enlarged, and in some cases, became continuous with others, forming large areas of fungoid-looking ulceration, in and immediately underneath the skin, which ulcers remained refractory to all forms of treatment.

Pharyngeal, submaxillary and sublingual lymph glands became enlarged, hard and exceedingly painful to the touch.

This animal, as will be shown later on, was submitted to a mallein test with negative results.

Remount No. 695.—Brown gelding, aged, Australian bred.

This animal was noticed on August 1st, 1915, with slight cough, slight catarrhal discharge from right nostril, and slight swelling of conjunctiva of right eye, making the eye bulge slightly; both eyes were lachrymating. Animal was dull and depressed, and refused all food, but drank freely. The temperature was 104.2° . Both submaxillary lymph glands were enlarged and painful to manipulation, the right gland being as

large as a walnut. Animal was isolated and placed under treatment similar to Remount No. 6,138.

Catarrhal discharge was present in both nostrils on the following day. It was tenacious and sticky, as in No. 6,138. Right eyelids increased in size and showed profuse lachrymation. Conjunctiva infected very markedly, small isolated petechial spotting on membrana nictitans and five small ulcerations on the margin of the junction of conjunctiva and skin of eyelids, towards inner corner of the eye. Left eye was lachrymating slightly. On the fifth day after isolation small nodular swellings appeared in the jugular furrow on the right side and about midway between the head and the shoulder. These increased in size and broke, discharging a similar material to that from similar nodules in a similar situation in Remount 6,138. This animal was also submitted to a mallein test. While undergoing the test a patch of ulceration about 2.5 cm. long by about 2.5 cm. to 3.5 cm. wide, and several smaller ulcers varying in size from that of a pin's head to a pea, were discovered on the Schneiderian mucous membrane of the right nostril. Small nodules, similar to those on the neck, also appeared on both hind legs about the gaskin when the test was in progress. Some of these latter burst and liberated a discharge exactly similar to that from nodules on the neck.

Remount No. 2,222.—Bay mare, 5 years, Australian bred. This animal had been tethered between No. 6,138 and No. 695 prior to their isolation. This animal was noticed on August 12th, 1915, with enlarged submaxillary glands, that on the right being increased to the size of a walnut, hard and exceedingly painful. There was no nasal discharge with the case, but slight conjunctivitis with lachrymation was present. Temperature was slightly above normal (100.8° F.). Appetite was good. The swelling continued in the submaxillary glands, but the pain subsided, the gland on the left being more freely movable than its more swollen fellow on the right, which appeared to be more immovable than normal. None of these animals (Remounts 6,138, 695 and 2,222) had been wounded for at least a month previous to isolation.

Remount No. 28.458, bay mare, and *Remount No. 639,* brown gelding.—These animals were noticed on August 21,

1915, to have slightly swollen submaxillary lymph glands, but were otherwise normal. No. 28,458 had a bullet wound in the biceps of the near foreleg; No. 639 was unwounded.

These animals were all sent to the Veterinary Hospital at Cape Helles and mallein tested. Results of the tests were as follow:—

Remount 6,138. Negative.

„ 695. Negative, retained for second test. Negative.

„ 2,222. Doubtful negative; re-tested. Second test, negative.

„ 28,458. Negative.

„ 639. Negative.

Prior to my leaving Cape Helles, both No. 6,138 and No. 2,222 had been returned from the Veterinary Hospital to the units. No. 6,138 had slight intermittent catarrh. Ulcers on neck were healing slowly, the most successful application being a lotion of plumbi acetatis et glycerinum (1 in 8).

No. 6,138 was hit by a piece of shell on September 19, 1915, which fractured the near tibia, and the animal was destroyed. An extensive post-mortem examination was made, but it revealed local lesions only, all the internal organs being healthy and normal. Remount 2,222 on return from Veterinary Hospital showed the submaxillary gland on the right side still enlarged and hard, though slightly reduced in size. It was not painful on manipulation. The enlargement in this gland still persisted when I left the unit on September 26, 1915.

Regarding a Diagnosis.—The clinical appearances suggested glanders, but this suspicion was negatived by the result of the mallein tests. In some respects the symptoms showed a resemblance to those of epizootic lymphangitis, excepting that there was absolute evidence that there were no wounds except to Remount 28,458 to allow of the entrance of organisms of this disease. While the lymphatic glands were swollen and painful, there was no evidence of cording of the lymphatic vessels themselves. The ulcers on the neck increased in size by individual ulcers enlarging and spreading from one to the other by direct continuity, and the breaking away of the intervening tissue.

It is regretted that the military situation did not allow of the collecting and forwarding of material from these cases for bacteriological examination.

ON SUBCUTANEOUS TUBERCULOSIS IN BOVINES.

By H. R. SEDDON, B.V.Sc.,

Lecturer in Pathology and Bacteriology, Veterinary School,
University of Melbourne.

UNDER the term of "tuberculides" lesions of tuberculosis of a peculiar type, occurring subcutaneously, in bovines have been described by various observers from time to time. The condition in the lower animals may be considered rare, and does not seem to have been described in British veterinary literature except on rare occasions. A record by Cust in THE VETERINARY JOURNAL for 1905 I have not been able to consult. Foulerton has described subcutaneous lesions which present certain features in common with the lesions encountered here, but which he considers due to a blastomycotic parasite, though absolute diagnosis was not possible. In our cases yeast-like bodies (such as he found) could not be detected.

Translations have appeared recently of two French articles on the subject, but a more exhaustive article by Pérard and Ramon seems to have escaped notice.

These authors described six cases in cattle in 1913, and as from their article it appears that the macroscopic appearances are often somewhat variable, and positive diagnosis often difficult, the lesions described by them will be referred to at some length.

In their cases the lesions were found both in the subcutaneous tissue and superficial muscles, and presented as round or oval nodules, for the most part freely movable under the skin, but in some adherent to the derma. Of the average size of a nut, they were encapsulated in a fibrous tissue envelope more or less thick, which on section did not present the same appearance in all cases. The majority were firm, homogeneous, and whitish-yellow or greyish in colour, with sometimes pinpoint spots a little darker, apparently corresponding to areas of caseo-calcification; at other times there were irregular radiating streaks recalling the "radiating caseation" of Bongert. Certain small nodules, however, exhibited a central softened area with perhaps traces of calcification. A third variety of lesions intermediate between these two types is also described. Two or even three types of nodules were sometimes found in one animal.

They further note that the glands corresponding to the region showing these lesions were sometimes tuberculous, but more often free. All their cases, however, were affected with tuberculosis of the lungs, and in the majority of cases in the thoracic lymph glands and often elsewhere. Of these internal lesions some resembled the subcutaneous lesions, but others had all the characters of classic tuberculosis. They note also forms of transition between the two.

As regards microscopical appearance, they note that this was very variable even among nodules which to the naked eye were identical. In the smallest nodules were all the elements of a classic tubercle—lymphocytes, epithelioid cells, giant cells and degeneration. In certain of the larger nodules the central degenerated area showed well-marked caseation with traces of calcification.

In the majority of the large nodules (which to the naked eye show little degeneration), however, the degeneration was incomplete, though affecting a large part of the nodule, and only by staining with Sudan III. were the early stages of caseation demonstrable. In these cases the zone of epithelioid cells was sometimes extremely reduced, as was the zone of mononuclears, and giant cells were rare. Acid-fast bacilli were not detected in these subcutaneous lesions, except in one case where a single one was found.

Inoculation experiments with emulsion of subcutaneous nodules were interesting. They were negative in two cases and positive in two others. In these two latter, however, the animals (guinea-pigs) were but slightly tubercular—that is, lesions were but slight even six weeks after inoculation. (Inoculation intraperitoneal; miliary granulations on omentum, spleen and liver.) They do not state from what "type" of subcutaneous nodules these animals were inoculated.

Microscopical examination of lung and glandular lesions were always positive, and inoculation of products from these lesions induced intense tuberculosis and death.

Pérard has since (1914) recorded a further case in a cow (also showing tuberculosis elsewhere), in which the lesions differed totally from those previously described by Ramon and himself. A résumé of the article was published in this Journal.

Cauchemez and Césari also describe a case presenting lesions of which absolute diagnosis was not possible, but which they consider was due to tuberculosis. This opinion is supported by the fact that no other cause could be determined, and that the animal came from a stable where tuberculosis existed—three other animals from there, killed the same day, suffering from that disease.

The animal in question (a cow) presented lesions in the lung, bronchial and other lymphatic glands, parietal pleura and the muscles. The bronchial and mediastinal lymphatic glands showed lesions similar to the "radiating caseation" type of tuberculosis. The hepatic and mesenteric lymphatic glands were similar, but the latter showed also some caseous foci which were not shown in the other groups referred to. The lung showed one nodule, the size of a nut, of firm consistence and a little elastic, of pinkish colour, with on section a whitish homogeneous surface giving the illusion of a cancerous metastasis rather than the impression of a lesion of tuberculosis.

The muscular lesions, extraordinarily numerous, were situated in the superficial muscle of the trunk. They presented the form of nodules of pale yellow colour, usually regularly round, varying in size from a millet seed to a pigeon's egg, with granular surface. On the cut surface small and large exhibited a uniform appearance, the lesions appearing to be constituted by an infinity of regular tubercles of the size of a millet seed closely packed together. Only some of the nodules had undergone commencing caseation of the central portion. The prepectoral, presternal and popliteal lymph glands were free.

Microscopical examination of the muscle nodules did not show any acid-fast bacilli or any other bacteria, mycelia, etc., and cultures were negative. Sections of a nodule showed an arrangement identical with that of tuberculosis—that is, round, epithelioid and giant cells and polymorphs.

Three guinea-pigs inoculated with the nodules and killed at the end of three months showed no tubercular or mycotic lesions.

During the past two years two cases have come under our notice, both from different local abattoirs.

Case 1.—Two rather flattened nodules about one inch in

longest diameter, rather dried up (and without adequate history), were submitted, because, though similar in shape and external appearance to the lesion of *Oncocerca gibsoni*, they did not show any evidence of parasite within. Sections showed a similar histology to the lesions presented in Case II.

Case II.—Bull, good condition. Scattered throughout the subcutaneous tissue and superficial muscles, especially of the brisket, neck and thigh, but also over the shoulder, ribs and buttock, were numerous flattened nodules.

The majority of these nodules were rather flattened and roughly circular or oval in contour, while others were almond shaped. In their longest diameter they varied from 1 cm. to 3 cm. There were occasional groups of up to five or six situated closely together, but the majority were scattered singly. Sharply circumscribed, they were but slightly encapsulated. On section they were of a fairly bright yellow colour, tough and on the whole homogeneous, though in some there were small areas lighter in colour. On drying in the air a slight laminated appearance was to be seen, chiefly towards the periphery of the nodule. Scrapings from the nodule were hard to obtain, and showed only cell debris and a few crystals.

Paraffin sections showed the greater part of the nodule to be degenerated, with, as one proceeded towards the periphery, chromatin granules, then epithelioid cells and a thin but definite capsule of fibrous tissue. No giant cells and no organisms were detected.

The prae-crural lymphatic gland showed typical caseo-calcareous foci of tuberculosis. The other lymph glands were apparently normal, and there were no gross lesions in other organs or parts.

A guinea-pig was inoculated with an emulsion of the lesions from the prae-crural lymph gland, and died 48 days later. Post-mortem examination showed typical tuberculosis.

Although in these cases no tubercle bacilli could be detected in the nodules, they appear to be similar to cases of subcutaneous tuberculosis elsewhere.

It is to be noted, however, that in the cases referred to, except that described by Pérard (in which the lesions were distinctly different in appearance) there were lesions of the internal

organs, and, further, that in many of the nodules giant cells were found.

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NOTES ON THE EARLY HISTORY OF THE VETERINARY PROFESSION IN VICTORIA.

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IN the early days of its occupation by white people, Australia was not an attractive field for the veterinary surgeon. Domestic animals that had been imported and their offspring enjoyed a remarkable immunity, not only from those epizootic diseases which have caused such devastation amongst the flocks and herds of older countries, but also from ordinary sporadic ailments. This immunity may be attributed to care in the selection of sound, healthy animals for importation, the long and trying voyage, which would eliminate the weak and unhealthy ones, the complete isolation from the countries where animal diseases were prevalent, and the extraordinary salubrity of the climate. Imported under such favourable conditions to a country pre-eminently adapted for their growth and reproduction, and with a food supply and environment unsurpassed, it will be of interest to trace briefly the origin and spread of disease amongst domestic animals.

So long as the original natural conditions remained undisturbed, domestic animals deserve their freedom from disease. They were allowed to roam freely over large areas of country, with every opportunity of choosing their own food, water, and

shelter. There was no loss of vigour from overcrowding and over-stocking, but, as they continued to breed and multiply out of all proportions to the limited requirements of the then small community, their value depreciated so much that the stock-owners became careless about selecting and mating them. They neglected to castrate and weed out the inferior male animals, and allowed males and females of all ages and relationships to run together, to the certain deterioration of their offspring.

As time went on and the population began to increase, a higher state of domestication became inevitable. The larger holdings were fenced off into smaller ones, the freedom of the animals became more restricted, there was less choice in the matter of feed and water, etc. Seasons of scarcity occurred and checked the growth of the young animals and weakened the resisting powers of the mature ones against disease. Parasitic diseases became prevalent and caused heavy losses. Further, and perhaps discriminate, importations took place, and the time occupied by the voyage became lessened. Seab was introduced from Tasmania. Outbreaks of malignant catarrh occurred in New South Wales as far back as 1834. In 1847, anthrax, then known as Cumberland disease, made its appearance on the Lepington estate, near Campbelltown, New South Wales, and in 1876 the first extensive outbreak occurred in Victoria. How or when the disease was first introduced is not known, but, when investigating the cause of an outbreak in a dairy herd near Geelong some fifteen years ago, I expressed the opinion that it had been introduced with bone meal which had been given to the cattle as a remedy for cripples. I took a sample of the meal to Dr. Cherry, then bacteriologist at the University of Melbourne, who confirmed the conjecture I had formed by making cultures of the anthrax bacilli from the meal. This meal was made from a shipment of bones that had arrived from India a short time before. Two other outbreaks occurred in the Dandenong district through using bone meal from the same source.

In 1858 contagious pleuro-pneumonia was imported by a cow which was diseased when landed, and died within six weeks, having in the meanwhile infected the herd of the importer. In 1870 an outbreak of foot-and-mouth disease occurred amongst cattle. Tuberculosis, tick fever, black leg, and white scour,

contagious abortion, epizootic ophthalmia in cattle, braxy, foot-rot, caseous adenitis in sheep, swine fever in pigs, strangles and influenza in horses have successively appeared, besides many others.

Various indigenous diseases, due to dietetic and other causes, also from time to time have caused heavy losses, and since dairying and closer settlement have been introduced, many, both enzootic and sporadic, diseases have become prevalent.

Pioneer Veterinary Surgeons.--The first veterinary surgeons to arrive in Australia were mostly men who, like others, had caught the gold fever, or were allured by prospects of successful stock-raising or wool-growing. A few no doubt came for health reasons. With the exception of one or two in Sydney and Melbourne, who carried on a more or less precarious practice in connection with shoeing businesses, there were no veterinary surgeons practising except a few unqualified men.

Some, after trying their luck on the goldfields, or in other occupations, either returned to their native land or wandered elsewhere. Among occupations which I have known qualified veterinary surgeons to be engaged in may be mentioned that of gold-digger, squatter, farmer, pound-keeper, trooper, stud-groom, coachman, groom in a cab stable, labourer in a brick-yard, labourer in the cane-fields of Queensland, insurance agent, ship's doctor, police magistrate, chief commissioner of police, member of parliament, and a medical student at the University of Melbourne.

Yet, in spite of this, empiricism was rampant from a very early period. Every city shoeing forge was styled a "Veterinary Shoeing Forge." Cases that were not treated by a qualified veterinary surgeon or a farrier received rough-and-ready treatment at the hands of the owner or some officious neighbour, or were allowed to "rip," if I may use an expression then in vogue. This "rip" treatment consisted in turning a sick or injured animal out to die or recover, as the case might be. The amount of cruelty inflicted both from commission and omission was truly lamentable. Animals were cheap and easily replaced; hence the neglect. A decent hack could be bought for from 10s. to £1. The only animals of value were stud horses, race-horses, and carriers' horses.

Down to 1880, when I arrived in Victoria, there were not more than a dozen qualified veterinary surgeons practising in the whole of Australia. There was not a single veterinary surgeon wholly employed in Government service in any of the states. It is true that veterinary surgeons inspected imported stock, and made occasional investigations into outbreaks of disease on behalf of the respective Governments. A few held honorary positions in the Defence Departments, and a certain amount of veterinary work was done for the Governments in connection with the Police and Postal Departments.

Amongst the early pioneer veterinarians the most familiar names are those of the Stewarts and Pottie, in Sydney; Shaw, Miscamble, Vincent, Mitchell, and Marsden, in Melbourne; Snowball, in Ballarat; Park at Warranambool; Rogerson, at Stawell; Aked at Dendigo; Chalwin, Bickford and Norton at Adelaide; and Irvine at Brisbane. Some of these had passed away and others had not come on the scene at the time I mention. Of course, there were others who practised at various times for a short while in different places, but their names are less familiar, and they can hardly be regarded as pioneers. The former are, however, the names of men which deserve to be handed down to posterity. The fact that they stuck to their profession and outlived all kinds of difficulties, upheld its dignity in every way, and laid a solid foundation for those who had to follow entitles them to our respect and gratitude. It would have been a pleasing task to have given short biographical sketches of some of these worthies had space permitted, but that must be left to some future occasion.

Stock Departments.—In consequence of the outbreak of scab in sheep, which for a time seriously threatened the wool industry, Scab Acts were passed by the various colonial Governments, and staffs of lay inspectors appointed. Credit must be given to them for the efficient way they carried out their duties under local authorities, and succeeded, in spite of great difficulties, in stamping out the disease. Later, when other epizootic diseases, such as pleuro-pneumonia, anthrax, etc., began to appear, "Diseases in Stock Acts" were passed, and the scab inspectors became stock inspectors. They were, however, far too few in number and wanting in scientific training to cope

with the spread of disease. As might have been expected, there was no systematic or continued effort to suppress or eradicate disease. The areas which they were expected to supervise were far too large, even if they had possessed the necessary scientific knowledge. Not only were heavy losses continually taking place from, to them, unmanageable diseases, but there was a total absence of supervision over meat and dairy produce.

Twenty-five per cent. of the cattle slaughtered for food at some of the suburban abattoirs were at some time affected with tuberculosis, while hydatids, fluke, cancer, and other diseases were quite common; and yet there was no inspection or any adequate restriction on diseased meat going into consumption. There was no veterinary inspection of dairy herds and milk, butter and cheese; the produce of diseased animals was openly sold without let or hindrance. The infant mortality was appalling, and outbreaks of typhoid fever and other diseases were distinctly traceable to insanitary dairies.

Government Veterinary Departments.—The first veterinary surgeon to receive a regular Government appointment was Mr. Anthony Willows, M.R.C.V.S., a fellow student of mine, who arrived in Sydney in 1883, and was appointed Veterinarian to the New South Wales Agricultural Department. He went to the Soudan War with the New South Wales Contingent, and died on the return voyage. Mr. Willows was succeeded by Mr. Edward Stanley, F.R.C.V.S., in 1895. Mr. Archibald Park, M.R.C.V.S., was retained by the Tasmanian Government to inspect imported stock, etc.; while Mr. Chalwin, Adelaide, and Messrs. Mitchell, Marsden, and myself were approved by the Governor in Council to inspect imported stock in Victoria. It was not, however, until 1897 that any regular public veterinary appointment in Victoria was made, when Mr. S. S. Cameron was appointed veterinary surgeon to the Board of Public Health. In 1905 he was transferred to the Agricultural Department, and other appointments soon followed. Other States have also established Government Veterinary Departments, but I do not propose to deal with them here.

Although good work has been done by the original pioneers of the profession individually in warning the public against the danger of animals' diseases, as a body they are numerically

weak and ineffective. Indeed, no attempt had been made to combine and act in unison, and every one seemed to be pulling in a different direction.

Such was the condition of affairs when I arrived in Melbourne; and when I had made up my mind to stay, and had thoroughly considered the situation, I came to the conclusion that there was a great deal of pioneering work yet to be done before the profession could obtain a permanent footing.

Two things appeared to be necessary, viz.:—

1. To overcome the ignorance and prejudice of stock-owners and the general public as to the aim and scope of veterinary science; and
2. To educate men for the veterinary profession who had been reared in the country, and were already acquainted with the special conditions.

The increasing frequency and great mortality caused by outbreaks of diseases such as pleuro-pneumonia and anthrax, caused considerable alarm, as was evidenced by the appointment of Royal Commission to inquire into them; but, instead of invoking the aid of the veterinary profession as they might have done, or even listening to frequent warnings and advice gratuitously given, the most irrational and absurd measures were adopted. Take the case of the first outbreak of the above-mentioned disease—contagious pleuro-pneumonia in cattle. Although diagnosed while yet confined to a single herd by the late Mr. Henry Wragge, M.R.C.V.S., and he had advised the immediate destruction of the whole herd, his advice was ignored; and while a Royal Commission sat to inquire into the cause, etc., the disease got away, and ultimately spread to every State in the Commonwealth.

But this was not the worst of the bungling. Laymen, ignorant of even the elements of pathological knowledge, essayed to inoculate cattle for the prevention of pleuro-pneumonia, and frequently used virus obtained from tuberculous animals, with the result that the latter disease was spread broadcast. That tuberculosis can be spread by pleuro virus obtained from an animal suffering from both diseases at the same time I have proved experimentally. Great mortality was also caused through the use of virus tainted with septic organisms.

The late Mr. Graham Mitchell, F.R.C.V.S., missed no opportunity of pointing out through the public press, and in every possible way, the folly of trusting to lay advisers, but, unfortunately, with little tangible result other than to bring calumny on himself, and to be called an alarmist.

The Hon. John Stewart, M.L.C., M.R.C.V.S., and Mr. T Chalwin, of Adelaide, likewise did much to enlighten the public on veterinary matters; but it was long before any beneficial effect became apparent. Mr. Mitchell had also written a pamphlet on anthrax.

Seeing that single-handed efforts produced so little effect, I called a meeting of the new veterinary surgeons that were available, and suggested the advisability of forming an association. The meeting was held at Menzies' Hotel, in 1880, the chair being taken by Mr. Mitchell; and it was decided to form an association. At a subsequent meeting, a set of rules which had been drawn up was submitted and approved, and office-bearers thereupon appointed, Mr. Mitchell being elected President, Mr. Vincent treasurer, and myself secretary. Nearly every qualified veterinary surgeon then in Australia joined either as an ordinary or corresponding member, including Sir Charles McMahon, M.R.C.V.S.; the Hon. John Stewart, M.L.C., M.R.C.V.S., Sydney; and Mr. R. Gibton, LL.D., M.R.C.V.S. Monthly meetings were regularly held, and various important questions discussed, and the results published in the daily press. A considerable amount of correspondence was carried on with members in other colonies, and good work was done in apprising the public of the necessity of more scientific efforts being made to suppress animal diseases and protect the public health.

In 1882 *The Australasian Veterinary Journal* was started, and published monthly, of which Mr. Mitchell, T. Chalwin and myself were co-editors. After a period of eighteen months or so, the journal had to be discontinued for financial reasons.

In 1891 a quarterly journal was commenced, viz., *The Veterinary and Live Stock Journal*, edited by Mr. S. S. Cameron, M.R.C.V.S., Mr. Forbes Burn, F.R.H.A.S., and the writer. This periodical had a considerable circulation amongst stock-owners, and it was with great regret that it had to be discontinued after some six or eight numbers had been published.

In 1901 a third journal was launched, *The Australasian Veterinary Journal*, a quarterly edited by W. A. N. Robertson, G.M.V.C. This also, for lack of support, collapsed after a few issues.

After that *The Farm and Home* opened its columns to the profession, and continued for years to publish specially written veterinary articles under the heading of "The Veterinary Record."

Besides these special publications, the public press had always willingly received articles on veterinary subjects.

In 1884 my small work on "The Diseases of Australian Horses" was published.

The veterinary articles were discontinued in *The Farm and Home* chiefly because the Gazettes and Journals published by the Government Agricultural Departments took up the publication of instructive veterinary articles, and have continued to do so up to the present. Other means of enlightening stock-owners and others on veterinary matters were the reading of papers and giving lectures and demonstrations before agricultural societies at the annual agricultural conventions, and at the annual conferences of the Butter Factory Managers' Association. A series of lectures on horse-shoeing and veterinary first aid was given at the Working Men's College. This work had all been done by private individuals, but is now more effectively carried on by the veterinary officers of the Agricultural Department.

First Attempt to Secure a State Veterinary School.—In 1882 the Veterinary Association succeeded in obtaining, through the then Minister of Lands, the Hon. Walter Madden, a small piece of land in the old police paddock at Richmond as a site for a Veterinary School or College. Although the site was much too small for the purpose, we were glad to get it, in the hope that we might be able to exchange it at some future date for a more suitable one. In this, however, we were disappointed. When it was found that we had made no use of it, and being further influenced by a deputation of Richmond residents who objected to a Veterinary College being established in their midst, the Government cancelled the grant. It will be of interest to relate that Mr. G. Mitchell had, on his

own initiative, instructed an architect to draw plans of the proposed college, and the Veterinary Association was served with plans and specifications. The association, having had no say in the matter, denied liability; thereupon Mr. Mitchell was personally sued for the amount, and was ordered by the court to pay the amount and costs. This broke up the association, and some years elapsed before another was formed.

In consequence of representations I had made through the press as to the great prevalence of tuberculosis amongst cattle slaughtered for human consumption, and demonstrations made before the officers of the Stock Department, the matter was brought before the Upper Chamber by the late Hon. James Buchanan, of Berwick, and a Royal Commission was appointed to inquire into it. A voluminous report of the evidence taken was published, together with numerous photographs of meat affected with different stages of the disease. As an outcome of this, a staff of inspectors was appointed to inspect at the abattoirs and markets, and it was also decided to appoint a qualified veterinary surgeon to inspect the city abattoirs and take statistics of the number of diseased animals slaughtered, and the diseases, etc. Unfortunately, no suitable applicant turned up and the appointment was never made.

During the next few years the profession in Melbourne received some additions, viz., Messrs. Goule, Cohen, Wragge, and Sharp, all of whom settled here. This accession led to the formation of another Veterinary Association, which immediately took up the question of framing a Veterinary Surgeons' Bill to enable stock-owners to distinguish between qualified and unqualified men, and to protect the interests of the profession. This Bill was based chiefly on the then existing English Veterinary Surgeons' Act, and, as secretary of the association, it fell to the writer's lot to make the rough draft. The Bill was brought before Parliament by the late Mr. Bosisto, M.P., and passed after receiving some additions at his hands from the Pharmacy Act, and further changes in the Upper House, particularly the introduction of a most important clause at the instance of the late Hon. Dr. Beaney, providing for a four years' course for qualification of veterinary surgeons.

(To be concluded.)

Clinical Article.

A CASE OF MELANO-SARCOMA IN THE DOG.

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CASES of melano-sarcoma with metastases in the lungs, spleen, etc., are so commonly associated in Victoria with a primarily ulcerating skin growth, and often, in addition, with the presence of a varying number of pigmented cutaneous warts, that the following case is of interest.

The animal in question, an Irish terrier, had been treated at the Hospital of this School at various times during the past three years for eczema, but at no time were pigmented warts or subcutaneous growths noticed. History of the case previous to this is unobtainable.

He was brought to the Hospital in a semi-comatose condition during January, 1914, but prior to this had not attended here for over six months. The next day the animal was found dead, and post-mortem revealed the following:—Body somewhat emaciated. No pigmented tumours on any part of the body, and none found in the subcutaneous tissue.

Abdomen.—Numerous small deeply pigmented nodules in mesentery and omentum. Lymph glands enlarged and black. Kidneys enlarged almost to the size of the closed fist, nodular on the surface showing black through the capsule; section showed numerous more or less circumscribed areas of new growth, varying in size up to that of a walnut, rather pulpy in consistence and black in colour, almost entirely replacing the cortex and extending into the medulla. Spleen showed two greyish pea-sized nodules in the parenchyma. Liver congested, no apparent infiltration by new growth.

Thorax.—Lungs thickly studded on surface and in parenchyma with black nodules varying somewhat in size but the majority about that of a small pea.

Pericardium showed small black nodules on surface, as did also the epicardium. Under the endocardium were similar nodules varying in size up to that of an almond, and there were some small lesions in the myocardium. Right costal pleura showed a rather diffuse deposit of black growth about one-eighth of an inch in thickness and present chiefly on its posterior portion. Anterior surface of diaphragm showed a similar appearance. Histologically the growth was a melano-sarcoma.

Clinically the experience here with pigmented ulcerating skin growths in dogs is that they are very readily metastatic, lesions being found in the neighbouring lymphatic glands and in the spleen and lungs, and, further, as might be expected, they are rapidly malignant.

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